FIFTY-FIFTH ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

FOR THE

FISCAL YEAR 1921-22

MARINE

PRINTED BY ORDER OF PARLIAMENT

OTTAWA
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1922

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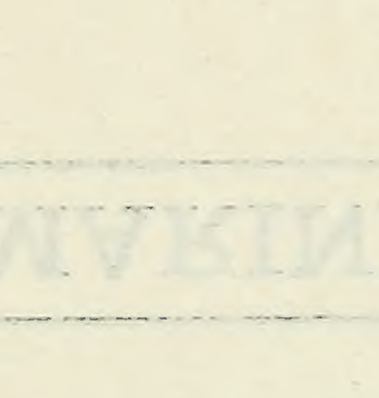

MARINE

DEPARTMENT OF MARINE AND FISHERIES

ANNUAL REPORT

FOR THE

YEAR ENDED 31st MARCH, 1904

PRINTED BY ORDER OF PARLIAMENT

To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B., G.C.M.G., M.V.O., Governor General and Commander in Chief of the Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the Fifty-fifth Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

ERNEST LAPOINTE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE,
OTTAWA, November, 1922.

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OF THE

DEPUTY MINISTER OF MARINE AND FISHERIES

To the Hon. Ernest Lapointe,
Minister of Marine and Fisheries.

Sir,—I have the honour to submit herewith my report for the fiscal year ended March 31, 1922.

At the beginning of the year 1921 there was a drop in the shipping under construction in the United Kingdom as compared with that in hand at the end of September, 1920. This although not particularly marked, was taken by Lloyds, in conjunction with a number of other factors, to indicate a decline in the British shipbuilding industry in the near future. This has now been clearly shown. Not only in the United Kingdom, but generally throughout the world, the shipbuilding trade, and trades allied with it, have suffered a serious setback.

There are a number of reasons for this general depression. To begin with, the sudden and dramatic ending of the war, which everybody thought would have lasted for at least another year, threw, at the close of 1919, a large amount of surplus tonnage on the market, chiefly from American yards, which otherwise might have been needed.

According to Lloyds, at the time of the armistice, November 11, 1918, the steam tonnage of the maritime nations of the world (excluding the Central powers) had suffered a net loss of 1,794,000 tons, since August, 1914.

Lloyds puts new construction for the years 1918 to 1920 inclusive, at about 18,500,000 gross tons. Of this tonnage American yards alone supplied 9,584,668 tons, as follows: 1918, 3,033,030 tons; 1919, 4,075,385 tons; 1920, 2,476,253 tons.

As a result of the sustained spurt of shipbuilding during this period, notably by the United States, but also by other maritime nations, world merchant tonnage at the close of 1920 exceeded the pre-war tonnage by 8,501,000 tons (Lloyds' statement).

The position of the shipping trade at the beginning of 1921 was therefore this: a heavy surplus of tonnage as compared with pre-war tonnage, and a dearth of cargoes, as compared with pre-war quantities, due to the decline of production in Europe generally.

These conditions combined with the high cost of shipbuilding and of ship operating, and the drop in ocean freight rates, following increased competition, made the building of new ships for the time being a losing venture, and even the operating of ships already built a doubtful one.

Hence the general stagnation in the shipbuilding industry and all allied industries.

Lloyds' returns of world shipbuilding (Germany excepted) for the quarter ended June 30, 1921, compared with that ended March 31, 1921, show unmistakably the general decline of the shipbuilding trade, particularly in the United States:—

Shipping in hand	June 30, 1921	March 31, 1921
(Gross tons) United States	717,000	1,102,000
" United Kingdom	3,530,000	3,798,000
" Other countries	1,952,000	2,186,000
Totals	6,199,000	7,086,000

The United Kingdom tonnage of 3,530,000 represents a total of 789 ships, steam, motor, and sail.

SIZE of Vessels Under Construction in United Kingdom, June 30, 1921.

Gross tonnage	Number		
	Steam	Motor	Sail
*100 and under 500 tons	88	17	17
500 " 1,000 "	92	.....	.....
1,000 " 2,000 "	77	6	.....
2,000 " 3,000 "	55	1	.....
3,000 " 4,000 "	62	3	.....
4,000 " 5,000 "	42	2	.....
5,000 " 6,000 "	80	4	.....
6,000 " 8,000 "	108	16	.....
8,000 " 10,000 "	48	8	.....
10,000 " 12,000 "	6	.....	.....
12,000 " 15,000 "	27	.....	.....
15,000 " 20,000 "	24	.....	.....
20,000 " 25,000 "	5	.....	.....
25,000 " 30,000 "	1	.....	.....
30,000 " 40,000 "	.....	.....	.....
40,000 tons and above	.....	.....	.....
Total	715	57	17

*Vessels of less than 100 tons are not included in Lloyd's Register Shipbuilding Returns.

These returns show that the shipbuilding decline, proportionately, is considerably less in the United Kingdom than in the United States, and the other maritime countries. The drop of 268,000 tons is not very formidable. But here again as at the beginning of the year Lloyds points out that the figures are not a true indication of the real position, which is considerably worse than appears on the surface.

The total of 3,530,000 tons includes 735,000 tons on which work has been suspended, and 444,000 tons on which work has been postponed, largely owing to the strike of the coal miners and shipyard joiners; so that the tonnage actually under way in British yards on June 30, 1921, was really 2,351,000 tons, a decrease of 1,447,000 tons as compared with that being built at the close of the previous quarter.

Lloyds also points out in further proof of the shrinkage in the work of British shipyards, that whereas in the quarter ended March 31, 1921, work was begun on 391,000 tons of steamers and motor vessels; in the quarter ended June 30, 1921, work commenced on only 68,000 tons of similar ships.

Although actually the shipbuilding industry in Britain has been adversely affected to a very considerable extent in common with the general depression, relatively, Britain's position as the leading shipbuilding nation of the world has been strengthened and emphasized.

In 1919 America completely outstripped Britain in shipbuilding. On June 30, 1919, America was building 1,350,000 tons of merchant shipping in excess of the United Kingdom, and 2,255,000 tons more than the other maritime countries combined. And at the close of 1919 she had accounted for 57 per cent of the world's output for that year.

At the end of 1920 America was still in the lead, her output being 2,476,253 tons; Britain's, 2,055,624 tons; other countries (Germany excepted), 1,279,371 tons. In 1920 America was responsible for 42 per cent of the world's output, the United Kingdom for 35 per cent.

Lloyds returns for June 30, 1921, show a complete change in the shipbuilding situation, Britain constructing 2,813,000 tons more than the United States, and 861,000 tons more than the United States and the other maritime countries combined, and accounting for about 60 per cent of the world's overseas tonnage in hand, United States for about 12 per cent. Britain thus for the time being surpassed her record for 1913 when she contributed 58 per cent of the world output.

The settlement of the coal miners' strike and consequent resumption of trade in her chief export ought to stimulate the shipping, shipbuilding, iron and steel, and engineering industries of Britain, all of which were vitally affected by the coal shortage.

Some measure of the dislocation of the British shipping trade, first by the reduced post-war output of the British coal mines, which was about one-third, per miner, of the pre-war output, and afterwards by their being practically closed for the period of the miners' strike, is furnished by a statement of American exports of coal to Europe, pre-war and 1920, appearing in an April number of *Fairplay*.

In 1913 American exports of coal to Europe amounted to 455,000 tons, in 1920 they reached 8,650,000 tons; to such an extent had the United States eaten into Britain's chief export trade.

Lloyds thus compares the steel and iron overseas steamship tonnages of the different maritime nations on June 30, 1914 and June 30, 1921:—

Country	June 30, 1914	June 30, 1921
	Gross tons	Gross tons
United Kingdom	18,877,000	19,288,000
British Dominions	1,407,000	1,950,000
America (U.S.)	1,837,000	12,314,000
Austria-Hungary	1,052,000	Nil
Denmark	768,000	866,000
France	1,918,000	3,046,000
Greece	820,000	576,000
Germany	5,098,000	654,000
Holland	1,471,000	2,207,000
Italy	1,428,000	2,378,000
Japan	1,642,000	3,063,000
Norway	1,923,000	2,285,000
Spain	883,000	1,094,000
Sweden	992,000	1,037,000

With the exceptions of the tonnage of Austria-Hungary, which has been wiped out, Germany's which has dropped to 654,000 from the five million mark, and that of Greece which has decreased by about 250,000 tons, all the other maritime countries show more or less substantial increases in the June 30, 1921, tonnages over those of June 30, 1914. United States tonnage shows a six-fold increase, Japan's is nearly double, France's increased by about 1,000,000 tons, and Holland and Italy show about the same proportionate increase.

In June, 1914, Britain owned 44·5 per cent of the world's overseas steamship tonnage, the United States 4·3 per cent. In June, 1921, Britain owned 35·5 per cent, the United States 22.7 per cent.

Allusions have been made in previous reports to what is termed the Five Per Cent Principle. The world's overseas merchant tonnage in June, 1914, amounted to 42,514,000 gross tons, in June, 1921, to 54,217,000 gross tons. The increase during this seven-year period roughly approximates to this principle. Had world production kept pace with the increase in the world's merchant marine it would have obviated the tying up of British, of continental, and possibly of American shipping.

On June 30, 1921, there were 1,447 ships of 1,263,000 tons fitted with internal combustion engines. On the same date in 1914 there were 290 ships of 234,000 tons similarly fitted. In 1914, 364 steamers of 1,310,000 tons were fitted for burning oil fuel; in 1921, 2,536 steamers of 12,797,000 tons. Of the merchant marine tonnage of 1921, 72 per cent used coal; in 1914 the percentage was 89.

The following Lloyds table shows at a glance the changes in the character of overseas shipping during the period 1914 to 1921:—

——	1914—Per cent of total gross tonnage	1921—Per cent of total gross tonnage
Sail power only	7·95	5·05
Oil, etc., in internal combustion engines	0·47	2·00
Oil fuel for boilers	2·62	20·65
Coal	88·96	72·30
	100·00	100·00

Mercantile Shipbuilding, 1921

These returns are from Lloyds Register's Annual Summary, are in gross tons and comprise only merchant ships of 100 gross tons or upwards.

UNITED KINGDOM

The launchings from the United Kingdom yards during 1921 totalled 1,538,052 tons; 517,572 tons less than those for 1920, and comprise 35 per cent of the world's output for the year.

Table showing the Countries for which the Merchant Vessels launched in the United Kingdom during 1921 have been built.

Country for which intended	No.	Gross Tonnage	Country for which intended	No.	Gross Tonnage
United Kingdom	287	946,182	Holland	19	123,811
British Dominions	12	66,373	Italy	3	30,164
Argentine	8	15,837	Japan	2	15,200
Brazil	4	1,601	Norway	39	134,551
Chili	2	4,750	Portugal	1	191
China	1	1,940	Roumania	1	3,550
Denmark	6	21,465	Spain	6	20,562
France	28	127,854	For sale or flag not stated	4	13,377
Greece	3	10,644			
			Total	426	1,538,052

Britain's chief foreign customers were Norway, France, Holland, and the British Dominions, in the order named. The tonnage for foreign owners amounted to 38.5 per cent of the total output.

The returns for the United Kingdom show that 103 vessels of between 5,000 and 10,000 each, and 24 vessels of 10,000 tons and upwards were launched. The following are the six largest:—

Laconia	19,730 tons
Windsor Castle	19,000 "
Conte Rosso	18,500 "
Tuscania	17,250 "
Moldavia	16,510 "
Montclare	16,400 "

Excluding vessels of less than 1,000 tons, 29 vessels with a gross tonnage of 209,000 have been launched which were built on the Isherwood system of longitudinal framing.

The average tonnage of steamers and motor vessels launched, excluding vessels of less than 500 tons, was 4,602 tons.

During 1921, 70 vessels, tonnage 624,487, were fitted with steam turbines, and practically all of them with geared turbines.

During the year 28 motor ships of 102,356 tons were launched, 11 of them were of 5,000 tons and upwards, the largest being about 9,500 tons.

Tonnage launched in England and Wales amounted to 867,600 tons, in Scotland to 551,856 tons, and in Ireland to 118,596 tons.

The leading shipbuilding centres were: Glasgow with 358,347 tons, and Newcastle with 354,813 tons.

UNITED STATES

The output for 1921 was 1,006,413 tons, which was 1,469,840 tons less than the 1920 output, and about 3,000,000 tons less than the record output for 1919.

The decrease was general all over the country. The Pacific Coast tonnage was 55.7 per cent of the 1920 tonnage, the Atlantic and Gulf ports' tonnage about 38 per cent, and the Great Lakes tonnage less than 9 per cent.

The United States tonnage, excluding ships of less than 1,000 tons, comprised 33 ships of 228,000 tons fitted with steam turbines, and 11 ships of 35,000 tons fitted with internal combustion engines. For the carriage of oil in bulk 92 steamers were launched, aggregating about 690,000 tons; 86 of these of about 670,000 tons were built on the Isherwood system of longitudinal framing.

The totals comprise 53 steamers of between 4,000 and 7,000 tons each, 50 of between 7,000 and 10,000 tons, and 18 of 10,000 tons and upwards, including the *Bethore,* the largest vessel launched in the United States during 1921, the product of the Bethlehem Shipbuilding Corporation Plant, at Sparrow's Point, Md.

GERMANY

Germany's output is given by Lloyds for the first time since 1913. During 1921, 242 vessels, total tonnage 509,064, were launched; this output exceeds that of 1913 by 44,000 tons.

In this tonnage are included 17 vessels of 72,777 tons to be fitted with steam turbines, and 7 vessels of 28,839 tons to be fitted with oil engines, also 40 vessels of between 4,000 and 7,000 tons each, 13 of between 7,000 and 10,000 tons, and one of about 14,000 tons.

HOLLAND

The tonnage launched during 1921, 232,402 tons, exceeds that of 1920 by 49,000 tons, establishing a record; as usual the figures do not include vessels intended for river navigation only.

Excluding vessels of less than 1,000 tons this tonnage comprises 13 vessels of about 81,000 tons to be fitted with steam turbines, 9 of which are between 6,000 and 8,500 tons. Three vessels aggregating about 12,500 tons are to be fitted with oil engines. Sixteen vessels of between 4,000 and 7,000 tons each were launched, and four of between 8,000 and 9,600 tons.

JAPAN

Japan's output, 227,425 tons, was 229,217 tons less than in 1920, a reduction of over 50 per cent; it still, however, exceeded the total output of the years 1910-13, inclusive, by over 30,000 tons

The 1921 total includes 21 vessels of between 4,000 and 7,000 tons each, 8 of between 7,000 and 10,000 tons each, and two turbine-engined ships of between 10,000 and 10,500 tons each.

Five vessels of 43,683 tons were fitted with steam turbines, and 3 of 21,058 tons were built for carrying oil in bulk.

FRANCE

The launchings in 1921 amounted to 210,663 tons, an increase of 117,214 tons over those of 1920, and established a record for French building. In the previous record year 1902, 192,196 tons were launched, 146,000 tons being made up of sailing vessels.

The figures for 1921 include 11 steamers of between 4,000 and 7,000 tons each, 11 of between 7,000 and 10,000 tons, and one of 10,741 tons.

Eleven vessels of 62,882 tons were fitted with steam turbines, including two, one of 10,741 tons, and one of 4,618 tons, for which turbo-electric compulsion was adopted.

SCANDINAVIAN COUNTRIES

Tonnage launched in Denmark, Norway, and Sweden, reached 194,607 tons, an increase of 31,260 tons over the 1920 output.

The increase in Denmark amounted to 16,569 tons, in Norway to 12,603 tons, and in Sweden to 2,088 tons, Denmark and Sweden furnishing records.

The totals include 8 vessels of between 4,000 and 7,000 tons each launched in Sweden, 3 in Norway, and 2 in Denmark; in Denmark also were launched 3 motor vessels of over 7,000 tons each, the two largest being about 8,700 tons each.

The tonnage of steel vessels fitted with internal combustion engines launched in Denmark—45.113 tons—is the largest for any country outside the United Kingdom.

ITALY

Italy's output for 1921, 164,748 tons, exceeded that of 1920 by 32,000 tons, and established an Italian record.

About twenty-five per cent of the 1921 output was from the Trieste district.

The totals include 23 steamers of between 4,000 and 7,000 tons and one of 7,756 tons. Eight vessels of 43,620 tons were fitted with steam turbines and 4 of 24,512 tons were built to carry oil in bulk.

BRITISH DOMINIONS

The British Dominions' output in 1921 of 129,675 tons was 74,000 tons less than in 1920. Canada launched 78,420 tons; less than half the output for 1920. On the coasts and on the St. Lawrence 11 steamers of between 4,000 and 7,000 tons and one of 7,177 tons were launched.

In the other British Dominions, 51,255 tons of shipping were launched, of which the Hong Kong district supplied 31,453 tons and Australia 17,408 tons. In the Hong Kong district 4 vessels of between 5,000 and 6,000 tons each were built.

SPAIN

During the year 47,256 tons were launched; this was an increase over the 1920 output of 1,306 tons, but fell short of the 1919 one by 5,353 tons.

The figures include 2 steamers of about 5,000 tons each, and 2 turbine vessels, one of 7,000 tons and the other of 10,137 tons.

SUMMARY

	Gross tons
United Kingdom	1,538,052
United States	1,006,413
Germany	509,064
Holland	232,402
Japan	227,425
France	210,663
Scandinavian countries (Denmark, Norway and Sweden)	194,607
Italy	164,748
British Dominions (Canada 78,420, other dominions 51,255)	129,675
Spain	47,256

Tonnage under construction at the end of 1921 was for the United Kingdom, 2,640,319 tons; Italy, 393,832 tons; France, 352,635 tons; Holland, 313,879 tons; United States, 216,428 tons; and Japan, 144,912 tons.

SUMMARY of the total output of Merchant Vessels in the World during 1921

Where built	Steamers		Motor Vessels		Sailing Vessels and barges		Total	
	No.	Gross tons	No.	Gross tons	No.	Gross tons	No.	Gross tons
United Kingdom	371	1,429,757	28	102,356	27	5,939	426	1,538,052
Other countries	698	2,537,976	108	204,286	145	61,365	951	2,803,627
Total for the world	1,069	3,967,733	136	306,642	172	67,304	1,377	4,341,679

TABLE showing Size of Steamers and Motor Vessels launched in the World during 1921

Country where built	Under 2,000 tons	2,000 to 3,999 tons	4,000 to 6,999 tons	7,000 to 9,999 tons	10,000 to 14,999 tons	15,000 to 19,999 tons	20,000 tons and above	Total
British Dominions	17	12	15	1	.....	.....	.....	45
Denmark	18	8	2	3	.....	.....	.....	31
France	19	15	11	11	1	.....	.....	57
Germany	146	23	40	13	1	.....	.....	223
Holland	62	13	16	4	.....	.....	.....	95
Italy	27	3	23	1	.....	.....	.....	54
Japan	6	6	21	8	2	.....	.....	43
Norway	29	3	3	.....	.....	.....	.....	35
Spain	1	5	3	1	1	.....	.....	11
Sweden	8	6	8	.....	.....	.....	.....	22
United Kingdom	164	76	90	45	18	6	.....	399
United States of America	16	12	53	50	17	1	.....	149
Other countries	32	2	3	4	.....	.....	.....	41
Total	545	184	288	141	40	7	.....	1,205

TABLE showing the Steam and Motor Tankers of 1,000 tons and upwards launched in the World during 1921

Country of Build	No.	Gross Tonnage	Country of Build	No.	Gross Tonnage
British Dominions	3	16,116	Japan	3	21,058
Denmark	2	6,242	Spain	1	4,597
France	3	22,990	Sweden	1	5,450
Germany	3	7,165	United Kingdom	38	250,868
Holland	1	1,050	United States of America	92	690,308
Italy	4	24,512			
			Total	151	1,050,356

General Review

The merchant shipping output of the world in 1921 was 1,519,987 tons less than that for 1920. United States yards showed a drop of 1,469,840 tons, British yards of 517,572 tons, but the total of the other countries shows a gain of 467,425 tons, the figures being:—

	Gross tons 1920	Gross tons 1921
United States	2,476,253	1,006,413
United Kingdom	2,055,624	1,538,052
Other countries	1,329,789	1,797,214
World total	5,861,666	4,341,679

A striking feature of Lloyds returns for 1921 is the re-entry of Germany into the shipbuilding field in decisive fashion. She at present occupies the third place among shipbuilding nations, and has surpassed her 1918 shipbuilding record by 44,000 tons. Should American shipbuilding continue to decline, Germany may ere long hold second place in world shipbuilding.

Though Great Britain, United States, Japan, and the British Dominions show a falling-off in the 1921 production as compared with that of 1920, Holland, France, Italy and the Scandinavian countries show substantial gains, and Spain a small one, and it seems apparent that the continental countries at present are bent on increasing the strengths of their merchant marines, and in this connection Lloyds comparison of proportionate shipbuilding for the pre-war year and the three years immediately succeeding the war is of interest.

	1913 per cent	1919 per cent	1920 per cent	1921 per cent
United States	8·3	57·1	42·2	23·2
United Kingdom	58·0	22·6	35·1	35·4
Other countries	33·7	20·3	22·7	41·4

It will be noticed that in 1921 for the first time the percentage of continental tonnage is higher than that of the United Kingdom, and also that in the space of two years that percentage was more than doubled, 1919 figures being 20·3 per cent, those of 1921, 41·4 per cent; taking into consideration the amount of shipping in hand in the continental countries at the close of 1921, already given, and the part again being played by Germany as one of the leading shipbuilding nations, it is very probable that the proportionate increase of continental shipping will be accentuated in 1922.

An important development of 1921 shipbuilding was the increase in the construction of tankers, of which about 65 per cent more were built in 1921 than in 1920, the United States taking the lead, as shown by the following Lloyds statement:—

	Gross tons 1921	Gross tons 1920
United States	690,308	567,000
United Kingdom	250,868	65,400
Other countries	109,180	8,000
World tanker output	1,050,356	640,400

There was also a tendency to build larger ships. In 1920, 32 ships of 10,000 tons and over were built; in 1921, 47.

Motor ship construction shows a gain. In 1921, 306,642 gross tons of shipping fitted with internal combustion engines were launched; in 1920, 189,977 tons.

In the tonnage of ships fitted with turbines, 1921 shows a decline, the 1921 tonnage being 1,195,000 tons, the 1920, 1,825,000 tons.

Lloyds estimates the total shipbuilding orders in hand at the beginning of 1922 at 4,457,000 gross tons; as much of this has, however, been already launched, and little new work is being placed, Lloyds is of the opinion that the 1922 output will probably be considerably less than the one for 1921.

Canadian Government Merchant Marine

Of the original Canadian Government merchant fleet of 63 ships, deadweight tonnage 380,160, for which contracts were placed in the different Canadian yards; the first, the *Canadian Voyageur,* 4,300 tons d.w., was delivered from the Montreal yards of Canadian Vickers in February, 1919; the last, the *Canadian Constructor,* 10,500 tons d.w., was handed over to the officials of the Canadian Government Merchant Marine on January 15, 1922, from the Halifax yards, for service on the New Zealand and Australian route.

The entire fleet comprises 65 ships, approximate deadweight tonnage 381,414; besides the ships with the prefix "Canadian" originally contracted for, it includes the *Drummond, Sheba,* and *McKee,* turned over to the company by the Department of Railways and Canals.

On the Atlantic coast the home ports of the fleet are Halifax and St. John for winter sailings, and on the St. Lawrence, Montreal for summer sailings. On the Pacific coast there are regular sailings from Vancouver to Australia, New Zealand, India, and the Orient. The larger ships now carry a certain number of passengers as well as freight.

The principal trade routes of the fleet were given in the 1920 report, under the heading "Marine Activities Affecting Canadian Ports."

American Merchant Marine

The fluctuations in the shipbuilding activities of the United States have of late been kaleidoscopic.

In 1919 America not only completely outbuilt the United Kingdom, but accounted for 57 per cent of the world output for that year.

In 1920 she still held the upper hand, accounting for 42 per cent of the world output, the United Kingdom for 35 per cent.

On December 31, 1920, United States had in hand 1,310,312 tons of shipping; on March 31, 1921, 1,102,672 tons; on June 30, 1921, 717,624 tons; on September 30, 1921, 433,962 tons; and on December 31, 1921, 216,428 tons.

In the course of a year United States shipping under construction had dropped by more than 1,000,000 tons. So rapid a rise, and so rapid a decline, has no parallel in the history of shipbuilding since ships were first built by men.

The returns here given are taken from the annual report of the American Commissioner of Navigation to the Secretary of Commerce for the fiscal year ended June 30, 1921.

American Shipping, June 30, 1914, and June 30, 1921

—	Foreign trade	Domestic trade		Total
		Great Lakes	Sea and River	
	Gross tons	Gross tons	Gross tons	Gross tons
June 30, 1914	1,076,152	2,882,922	3,969,614	7,928,688
June 30, 1921	11,081,690	2,361,166	4,839,280	18,282,136

Practically the entire increase of American merchant shipping during this seven-year period is due to ships built for foreign trade.

Great Lakes shipping shows a drop of 521,756 tons, and sea and river shipping an increase of 869,666 tons, the two nearly balancing.

Sea-going tonnage of 1921 is between ten and eleven times greater than in 1914. The 1921 tonnage does not include eleven of the large German ships seized, aggregating 167,000 gross tons, of which the *Leviathan* (54,281 gross tons) is the largest. These ships, however, were laid up on June 30, 1921, together with a number of others; the present operating strength of the American overseas merchant marine is therefore somewhat less than is shown by the table:—

COMPARISON of American Merchant Marine of 1920 and 1921

Geographical Distribution	1920		1921	
	Number	Gross tons	Number	Gross tons
Atlantic and Gulf coasts	16,850	9,738,819	16,972	11,852,435
Pacific coast	6,512	3,326,285	6,409	3,467,872
Northern lakes	3,091	3,138,690	2,942	2,839,514
Western rivers	1,730	120,230	1,689	122,315
Total	28,183	16,324,024	28,012	18,282,136

VESSELS Built During Fiscal Years 1920 and 1921

Geographical Distribution	1920		1921	
	No.	Gross tons	No.	Gross tons
Atlantic Gulf coasts	993	2,139,537	819	1,533,930
Pacific coast	622	1,336,335	281	613,625
Northern lakes	267	394,467	130	106,731
Western rivers	185	10,300	131	10,829
Total	2,067	3,880,639	1,361	2,265,115
Power and Material				
Sail—				
Wood	113	128,001	69	90,554
Metal	2	4,183	1	1,189
Total	115	132,184	70	91,743
Steam—				
Wood	224	322,917	76	29,426
Metal	[1]741	3,279,852	[2]375	2,000,994
Total	965	3,602,769	451	2,030,420
Gas—				
Wood	688	48,035	491	12,810
Metal	25	9,219	[3]22	27,991
Total	713	57,254	513	40,801
Canal—Wood	2	259	23	3,278
Barges—				
Wood	233	72,378	231	69,668
Metal	[4]39	15,795	[5]73	29,205
Total	272	88,173	304	98,873
Total construction	2,067	3,880,639	1,361	2,265,115

[1] Includes 6 concrete steam vessels of 23,119 gross tons.
[2] Includes 6 concrete steam vessels of 37,553 gross tons.
[3] Includes 1 concrete gas vessel of 1,435 gross tons.
[4] Includes 7 concrete barges of 2,112 gross tons.
[5] Includes 10 concrete barges of 2,709 gross tons.

From 1907 to 1914 American steel steam tonnage increased only by 1,260,000 gross tons; that of foreign countries increased by 11,600,000 gross tons.

From 1914 to 1921 American steel steam tonnage increased by 10,500,000 gross tons, while corresponding foreign tonnage increased only by 2,300,000 gross tons.

In 1907 the United States had less than 10 per cent of the world steel steam tonnage, in 1914 still less than 10 per cent, and in 1921, 26 per cent.

PERCENTAGE of the Value of American Foreign Trade Carried by American Ships, 1914-21

Year	In American vessels	In Foreign vessels	Total	Per cent in American vessels
	$	$	$	
1914	368,359,756	3,417,108,756	3,785,468,512	9·7
1915	571,931,912	3,420,693,563	3,992,625,475	14·3
1916	948,908,216	4,877,132,995	5,826,041,211	16·3
1917	1,452,086,468	6,367,408,665	7,819,495,133	18·6
1918	1,688,495,946	6,015,204,510	7,703,700,456	21·9
1919	2,493,503,456	6,466,594,938	8,960,098,394	27·8
1920	5,071,623,227	6,803,374,582	11,874,997,809	42·7
1921	3,547,647,439	5,362,787,271	8,910,434,710	39·8

American sea carrying trade has naturally kept pace with the increase of the American merchant marine. The value of the trade carried in American bottoms steadily increased during the years 1914-20 with the increase of American shipbuilding, and declined in 1921 with its decline, but the total value of imports and exports carried in American bottoms during 1921 was more than four times greater than in 1914, the percentages as shown by the table being 39·8 and 9·7 respectively.

JAPANESE MERCHANT MARINE

For these returns of the strength and distribution of Japan's merchant marine in April, 1921, obtained from Japanese official sources, the department is indebted to the Consul General for Japan at Ottawa.

NUMBER and Tonnage of Ships under Japanese Registry at the end of March, 1921

STEAMSHIPS

Tonnage	Number of Ships	Approximate total tonnage
		tons
20 — 100 tons	1,331	55,630
100 — 300 "	438	78,427
300 — 500 "	207	83,183
500 — 1,000 "	342	259,772
1,000 — 2,000 "	259	366,072
2,000 — 3,000 "	174	424,054
3,000 — 4,000 "	112	378,980
4,000 — 5,000 "	56	247,723
5,000 — 6,000 "	120	682,116
6,000 — 7,000 "	34	220,838
7,000 — 8,000 "	27	199,113
8,000 — 9,000 "	5	40,900
9,000 — 10,000 "	10	95,437
10,000 and over	6	71,631
Total	3,101	3,203,876

SAILING BOATS

Tonnage each Boats	Number of Boats	Approximate total tonnage
		tons
20 — 100 tons	12,101	567,266
100 — 300 "	2,818	398,089
300 — 500 "	59	22,860
500 — 1,000 "	5	3,503
1,000 — 2,000 "	2	2,366
2,000 and over	1	2,403
	14,966	996,487
Under 20 tons	933	29,841
Total	15,899	1,026,328

DISTRIBUTION of Japanese Steamships of over 1,000 Tons each at the end of April, 1921

Bound to	No. of Ships	Tonnage
		tons
Coast of Japan	214	438,738
Vladivostock	11	25,633
Korea	23	38,775
North China	67	151,541
Central China	31	78,322
Formosa	15	53,131
South China	36	93,702
Yangtse River, China	12	30,345
Pacific Islands	7	22,861
Hawaii	20	75,594
Straits Settlements	31	86,558
India	46	191,648
Australia	13	59,081
Europe	70	412,946
North America (East coast)	31	188,925
Central America	9	47,601
South America (East coast)	14	81,858
South America (West coast)	9	57,992
North America (West coast)	29	242,420
Chartered by foreigners	29	90,795
Ships lying idle	51	143,566
Being repaired	18	64,674
Stranded	1	1,218
Total	787	2,677,924

An interesting feature of the Japanese merchant marine is the comparatively high proportion of sailing ships included in it. These comprise about 25 per cent of the total Japanese tonnage and are five times as numerous as the steamships.

In the distribution of Japanese steamships of 1,000 tons and over, the Japanese returns give the number and tonnage of the ships on April 30, 1921, not in commission under the Japanese flag, under the titles, "Chartered by foreigners," "Ships lying idle," and "Stranded"; the sum total of these is 81 ships, tonnage 235,579; the effective strength of the steamships of 1,000 tons and over of the Japanese merchant marine on April 30, 1921, was accordingly 706 ships, of 2,442,345 tons.

During the fiscal year April 1, 1920, to March 31, 1921, 86 vessels were launched, their approximate tonnage being 410,000 tons.

Drop in Ocean Freight Rates

A November, 1921, number of *The Nautical Gazette* states that rates on general cargo from North Atlantic American ports to the United Kingdom and continental ports were 20 per cent lower than in 1920, while the decline on wheat was 46 per cent and on flour 55·5 per cent.

From the Gulf ports general cargo rates had dropped 18 per cent, the rates on wheat 48 per cent, on flour 47 per cent, and on cotton 64 per cent.

The average reduction on general cargo and basic commodities amounted to about 40 per cent.

From the port of New York to United Kingdom and continental ports the 1920 and 1921 rates are given as follows:—

	1920		1921	
	Per cub. ft. cts.	Per 100 lbs. $	Per cub. ft. cts.	Per 100 lbs. $
United Kingdom	50	1.00	40	0.75
Antwerp-Rotterdam	45	0.90	40	0.75
Copenhagen	70	1.50	55	1.00
Bordeaux	40	0.80	35	0.40
Hamburg	50	1.00	45	0.55½
Marseilles	60	1.50	50	0.92
Genoa	65	1.20	50	1.00

And from New York to the Near East:—

	Per 2,240 lbs. or 40 cubic feet	
	1920	1921
Trieste	$32.50 net	$26.00 net
Smyrna	25.00 "	22.00 "
Alexandria	25.00 "	22.00 "
Piræus	26.00 "	22.00 "
Constantinople	28.00 "	22.00 "

Rates from New York to African ports also show a decline. The rate to Capetown in November, 1920, was $27 per 2,240 pounds or 40 cubic feet; in November, 1921, the standard quotation was $23. To Durban the 1920 rate was $28.80; the 1921 rate $24.80.

From United Kingdom ports rates have fallen to such a point that only vessels operated on the cheapest basis can show a moderate profit after clearing expenses. Tonnage has so far exceeded cargoes, and competition as a result become so keen, that rates have been cut to a minimum in order to avoid the tying up of ships.

British Merchant Marine's Part in Late War

An authentic and detailed summary of the actual services rendered by Britain's merchant marine during the war has at length been given by Sir Joseph McLay, Bart. (Controller of British Shipping from 1916 to the close of the war), in his presidential address to the Institute of Marine Engineers on November 1, 1921.

Of steamers, 500 gross tons and over, there were employed as auxiliaries for purely naval purposes during the war period 1,181 ships of 3,531,029 gross tons.

From August, 1914, to November, 1920, the number of individuals carried to and from all the war fronts was 33,340,736.

Up to the armistice (November 11, 1918) 49,000,000 tons weight of army stores alone (all civil shipments excluded) was carried; up to November, 1920, 56,000,000 tons weight.

Of horses and other animals two and a half millions were carried for army purposes, many of them on long voyages to Australia, Mesopotamia, India, Egypt, etc., and from River Plate to Egypt, France, and the United Kingdom. At one period of the war 40,000 horses and mules were brought monthly from the United States and River Plate to the United Kingdom.

In 1918, France had the equivalent of over 1,000,000 gross tons of British shipping at her entire disposal, which carried 43 per cent of her total imports; at the same time Italy had the equivalent of over 500,000 tons of British shipping, which carried about 45 per cent of her total imports.

During 1918 over 1,000,000 troops were brought from the United States in British ships. From March to August, 1918, 124 additional ships were employed in this service, and every American soldier carried shut out two tons of essential cargo.

The total number of British merchant seamen engaged in the war was about 300,000; number of lives lost, 15,629.

Sir Joseph gives the total loss of British shipping during the war by submarines and other risks, including only vessels of 500 gross tons and over, as 9,943,000 gross tons.

Operations of Chief Canadian Shipbuilding Plants

WALLACE SHIPBUILDING AND DRYDOCK COMPANY, LIMITED, NORTH VANCOUVER, B.C.

During the fiscal year, 1921-22, the following ships were completed and delivered: SS. *Canadian Scottish,* cargo steamer, 8,350 tons d.w., Canadian Government; SS. *Canadian Britisher,* cargo steamer, 8,350 tons d.w., Canadian Government; SS. *Canadian Skirmisher,* cargo steamer, 8,350 tons d.w., Canadian Government; SS. *Princess Louise,* passenger steamer, Canadian Pacific Railway; M.S. *Rio Bonita,* motor yacht, A. M. Dollar.

The SS. *Admiral Farragut* and the SS. *Lady Evelyn* were reconditioned, and repairs of various sorts, either to engines and boilers, or to decks and hulls, were made to twenty-eight steamers and twelve tugs.

DAVIE SHIPBUILDING AND REPAIRING COMPANY, LIMITED, LAUZON, P.Q.

New construction during the fiscal year 1921-22: SS. *Canadian Challenger,* single screw cargo steamer for Canadian Government, length 400 feet, breadth 52 feet, depth 31 feet, tonnage 8,350 tons d.w., speed $11\frac{3}{4}$ knots.

Miscellaneous repairs were made to 38 ships, 3 tugs, 3 dredges, and 3 barges.

J. COUGHLAN & SONS, LIMITED, VANCOUVER, B.C.

The firm during the year completed two vessels of 8,350 tons d.w. capacity, each, for the Canadian Government.

Very little repair work was done, totalling in value about $5,000.

PORT ARTHUR SHIPBUILDING COMPANY, LIMITED, PORT ARTHUR, ONT.

New construction: *Canadian Harvester,* tonnage d.w., 4,000; horse-power, 1,300. *Glenafton,* tonnage d.w., 2,000; horse-power, 1,300.

Reconstruction: *Francis Widlar,* tonnage gross, 4,682; horse-power, 1,460.
Repair work:

Total number of boats entering plant for repairs	85
Total number hull repair jobs	53
Total number engine repair jobs	27
Total number boiler repair jobs	17
Total number	97

Dry Dock report.—Number of boats docked on tonnage basis, 7; gross tonnage, 29,143; number of barges and tugs docked, 7.

HALIFAX SHIPYARDS, LIMITED, HALIFAX, N.S.

New construction.—Two 10,500 d.w. tons cargo steamers for Canadian Government, viz., *Canadian Cruiser* and *Canadian Constructor.*

Repair work.—The value of the repair work done in the yards during the year amounted to $676,156.80.

CANADIAN VICKERS, LIMITED, MONTREAL, P.Q.

New construction.—*Canadian Commander,* 5,493 gross tons, Canadian Government. *Canadian Leader,* 5,492 gross tons, Canadian Government. *Idefjord,* 4,432 gross tons, Norwegian-America line. *Topdalsfjord,* 4,432 gross tons, Norwegian-America line.

Repair work.—Docked and repaired, 49 ships, total gross tonnage 160,714. Repaired 15 vessels afloat in Montreal harbour, total gross tonnage 87,621.

MIDLAND SHIPBUILDING COMPANY, LIMITED, MIDLAND, ONT.

New construction.—*Canadian Logger,* 3,838·5 d.w. tons, Canadian Government.

Reconstruction.—*Glenclova,* equipped with masts, booms and winches, and cargo handling appliances for sale water service.

Repair work—Hull repairs were made to 13 ships, and general overhaul and repairs to 19 others.

STATISTICS OF CANADIAN SHIPPING

STATEMENT of Vessels Built in Canada and Registered during the Year 1921

Province	Wood									Metal									Totals		
	Sailing			Steam			Gas			Sailing			Steam			Gas					
	Tonnage			Tonnage			Tonnage			Tonnage			Tonnage			Tonnage			Tonnage		
	No	Gross	Net	No	Gross	Net	No	Gross	Net	No	Gross	Net	No.	Gross	Net	No	Gross	Net	No	Gross	Net
Nova Scotia	16	2,993	2,287	13	2,049	954	7	400	290				2	14,356	8,826				38	19,798	12,357
New Brunswick	1	536	487				4	76	60										5	612	517
Prince Edward Island																					
Quebec	18	2,257	2,130	1	11	7	8	352	298				14	17,125	28,365				41	49,745	30,800
Ontario				9	315	162	6	196	116				2	3,791	2,108				17	4,302	2,386
Manitoba				2	893	526	5	72	46										7	966	572
Saskatchewan				1	85	51													1	85	51
British Columbia	16	5,312	5,191	6	1,275	793	4	491	334				6	27,450	16,618				72	34,561	22,939
Yrkon																					
Totals	51	11,128	10,093	32	4,629	2,496	74	1,590	1,144				24	92,722	55,917				181	110,069	69,655

Vessels Built in 1921 and Exported without being Registered in Canada

Steam—Steel

Province	No.	Gross Tonnage	Net Tonnage
Nova Scotia	1	381·57	50·01
Quebec	3	13,682·24	8,013·76
Total	4	14,063·81	8,063·77

Statement showing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1921

Ports	Sailing Vessels			Steam Vessels		
	No.	Gross Tons	Net Tons	No.	Gross Tons	Net Tons
New Brunswick						
Campbellton				1	69	13
Chatham	308	8,128	7,854	95	3,733	2,312
Dorchester	2	277	262	2	8	6
Moncton	2	28	26			
Richibucto	20	363	353	14	257	191
Sackville	1	12	12	1	16	11
St. Andrews	111	1,962	1,904	39	840	590
St. John	163	18,347	17,715	100	13,482	9,207
	607	29,117	28,126	252	18,405	12,330
Nova Scotia						
Amherst	2	97	80	3	192	120
Annapolis Royal	12	3,394	3,007	8	677	423
Arichat	64	1,636	1,605	30	503	467
Barrington Passage	34	799	769	36	738	655
Canso	33	936	883	6	108	102
Digby	66	2,904	2,764	16	1,013	718
Guysboro	3	308	279			
Halifax	132	9,186	8,891	140	55,770	34,144
La Have	38	8,959	7,352	5	432	325
Liverpool	22	2,490	2,219	22	898	508
Lunenburg	206	26,054	20,711	150	3,875	2,992
Maitland	6	796	713	1	88	59
Parrsboro	52	18,393	16,918	17	1,883	1,436
Pictou	11	2,416	2,251	12	2,229	1,389
Port Hawkesbury	26	494	494	8	208	173
Port Medway	5	253	253	5	76	71
Shelburne	33	1,310	1,310	18	866	663
Sydney	57	4,054	3,857	41	2,493	1,343
Truro				1	18	7
Weymouth	25	7,920	7,086	13	677	504
Windsor	30	16,864	15,569	17	4,300	2,616
Yarmouth	87	2,694	2,554	57	10,281	5,181
	944	111,957	99,565	606	87,325	53,896
Ontario						
Amherstburg	5	1,300	1,266	8	895	471
Belleville	3	241	217	10	232	138
Bowmanville	1	146	146			
Brockville	1	819	751	13	490	318
Chatham	4	566	556	7	302	201
Cobourg						
Collingwood	4	1,119	1,119	44	15,579	10,439
Cornwall				4	123	75
Deseronto	5	403	370	3	31	22
Dunnville	1	87	57			
Fort William	1	413	413	2	507	333
Goderich	4	675	675	27	1,450	962

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1921—*Continued*

Ports	Sailing Vessels			Steam Vessels		
	No.	Gross Tons	Net Tons	No.	Gross Tons	Net Tons
Hamilton	3	807	780	20	9,160	5,700
Kenora	6	535	535	87	3,333	2,109
Kingston	46	7,882	6,998	100	9,428	5,515
Lindsay				12	397	271
Midland	7	3,681	3,166	51	62,979	41,548
Napanee	1	122	122			
Oakville	1	26	26			
Ottawa	106	16,796	15,862	209	43,014	22,271
Owen Sound	4	1,619	1,399	31	3,249	2,157
Peterboro	21	1,622	1,622	47	982	670
Picton	6	2,092	1,906	8	3,945	2,776
Port Arthur	66	21,841	21,352	73	22,349	13,387
Port Burwell	1	65	65	9	295	152
Port Dover	1	68	68	14	502	320
Port Hope	1	276	276			
Port Stanley				24	989	634
Prescott	8	1,323	1,195	12	2,262	1,528
Sarnia	7	2,190	2,019	36	31,663	19,693
Sault Ste. Marie	38	7,636	7,355	47	18,252	11,448
St. Catharines	21	5,937	5,356	43	1,567	993
Simcoe	2	36	36	2	35	18
Southampton				9	305	207
Toronto	62	14,166	12,256	256	106,425	67,656
Wallaceburg	2	490	475	9	381	264
Whitby						
Windsor	11	2,553	2,429	14	6,480	3,800
	450	97,532	90,868	1,231	347,601	216,076
Quebec						
Gaspe	11	475	435	3	266	186
Magdalen Islands	9	441	432	1	135	92
Montreal	260	88,433	84,958	408	495,561	303,779
Paspebiac	14	605	574	7	213	150
Quebec	311	29,560	28,589	162	29,279	16,791
Sorel	23	9,423	8,406	43	11,614	5,425
	628	128,937	123,394	624	537,068	326,423
British Columbia						
New Westminster	101	15,978	15,938	244	9,789	5,512
Prince Rupert	5	2,218	2,128	81	14,970	9,050
Vancouver	299	51,578	51,026	826	189,034	116,316
Victoria	102	24,222	23,170	250	50,674	29,736
	507	93,996	92,262	1,401	264,467	160,614
Prince Edward Island						
Charlottetown	106	6,745	6,309	31	7,036	3,251
Saskatchewan						
Prince Albert	1	145	145	4	534	302
Manitoba						
Winnipeg	14	3,877	3,877	72	8,803	5,722
Yukon						
Dawson				4	1,204	813

STATEMENT showing the Number of Vessels and Number of Tons on the Registry Books of the Dominion of Canada, on December 31, 1921—*Concluded*

RECAPITULATION

Province	Sailing Vessels			Steam Vessels		
	No.	Gross Tons	Net Tons	No.	Gross Tons	Net Tons
New Brunswick	607	29,117	28,126	252	18,405	12,330
Nova Scotia	944	111,957	99,565	606	87,325	53,896
Ontario	450	97,532	90,868	1,231	347,601	216,076
Quebec	628	128,937	123,394	624	537,068	326,423
British Columbia	507	93,996	92,262	1,401	264,467	160,614
Prince Edward Island	106	6,745	6,309	31	7,036	3,251
Saskatchewan	1	145	145	4	534	302
Manitoba	14	3,877	3,877	72	8,803	5,722
Yukon	.....	.....	.....	4	1,204	813
	3,257	472,306	444,546	4,225	1,272,443	779,427

It is estimated that 52,827 men and boys, etc., inclusive of masters, were employed on ships registered in Canada during the year 1921.

STATEMENT showing Number of Vessels Removed from the Registry Books of the Dominion of Canada during the Year ended December 31, 1921

Sold to foreigners	34
Wrecked	56
Stranded	11
Lost	30
Broken up	381
Abandoned at sea	17
Collisions	3
Foundered	28
Burnt	33
Missing	4
Registry no longer required	3
Transferred to St. John's, Newfoundland	29
Transferred to Great Britain	4
Transferred to British West Indies	3
Transferred to South Africa	1
Transferred to Guernsey, Channel Islands	1
Registered in error	2
Total	640

COMPARATIVE STATEMENT showing the Number of Vessels and Number of Net Tons on the Registry Books of the Dominion of Canada, on December 31, in each Year from 1912 to 1921, both inclusive

Province	1912		1913		1914		1915		1916	
	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons
New Brunswick	1,001	57,369	1,031	60,020	1,052	55,522	1,068	56,219	1,074	49,817
Nova Scotia	2,158	143,295	2,106	138,107	2,098	135,053	2,087	125,567	2,064	123,058
Quebec	1,566	227,018	1,628	247,225	1,663	259,143	1,590	267,897	1,452	273,770
Ontario	2,017	253,376	2,012	279,642	2,100	314,660	2,111	312,971	2,116	328,531
Prince Edward Island	148	9,577	149	10,071	149	10,029	158	11,518	155	10,652
British Columbia	1,376	136,618	1,506	15,306	1,591	147,192	1,643	144,835	1,687	145,525
Manitoba	95	6,096	93	5,545	103	7,999	84	7,480	95	8,953
Yukon District	14	2,513	15	2,940	11	2,295	11	2,295	11	2,295
Saskatchewan	5	356	5	356	5	529	5	530	5	530
	8,380	836,278	8,545	896,965	8,772	932,422	8,757	929,312	8,659	943,131

Province	1917		1918		1919		1920		1921	
	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons
New Brunswick	1,074	49,883	1,043	49,483	1,018	42,050	917	38,634	859	40,456
Nova Scotia	2,010	119,805	1,948	124,517	1,965	158,100	1,709	152,130	1,550	153,461
Quebec	1,391	283,942	1,318	175,235	1,340	342,424	1,321	409,442	1,252	449,817
Ontario	2,079	311,283	2,064	312,865	1,986	320,065	1,793	313,875	1,681	306,944
Prince Edward Island	157	10,955	158	10,805	158	10,726	143	9,993	137	9,560
British Columbia	1,734	183,002	1,928	231,513	2,006	207,708	1,930	217,481	1,908	252,876
Manitoba	5	530	96	9,791	89	9,160	83	9,119	86	9,599
Yukon District	99	9,834	8	2,040	6	1,133	4	813	4	813
Saskatchewan	10	2,204	5	529	5	529	4	393	5	447
	8,559	971,438	8,568	1,016,778	8,573	1,091,895	7,904	1,151,880	7,482	1,223,973

Comparative Statement of Vessels Built and Registered in the Dominion of Canada and their Net Tonnage during the Year ended December 31, in each Year from 1912 to 1921, both inclusive

Province	1912		1913		1914		1915		1916	
	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons	Vessels	Tons
New Brunswick	44	1,092	45	1,114	31	1,319	22	1,114	22	332
Nova Scotia	126	5,853	67	4,899	56	3,303	51	2,982	65	7,661
Quebec	49	5,744	62	8,667	51	6,753	49	7,790	51	8,643
Ontario	71	11,170	38	15,572	78	23,567	38	4,709	26	5,507
Prince Edward Island	1	34	3	804	2	35	2	24	.....	.....
British Columbia	128	10,647	128	9,000	97	5,867	79	2,057	65	4,487
Manitoba	1	546	1	18	11	2,899	5	156	15	1,573
Yukon District	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Saskatchewan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	420	34,886	344	40,164	327	43,246	246	18,832	244	28,303

Province	1917		1918		1919		1920		1921	
New Brunswick	23	1,156	16	2,590	14	3,326	5	103	5	547
Nova Scotia	86	14,781	110	27,831	163	43,877	87	15,440	38	12,357
Quebec	32	8,058	26	9,086	46	45,831	82	48,303	41	30,800
Ontario	21	3,949	48	10,098	37	10,858	14	3,004	17	2,386
Prince Edward Island	.....	.....	4	78	5	507	4	270	.....	.....
British Columbia	77	17,452	192	54,889	138	23,396	136	35,512	72	22,939
Manitoba	4	881	1	39	4	143	.....	.....	7	572
Yukon District	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Saskatchewan	.....	.....	.....	.....	.....	.....	1	147	1	54
	243	46,277	397	104,611	407	127,938	329	102,779	181	69,655

REPORT OF B. H. FRASER, M.E.I.C., CHIEF ENGINEER

Office Work

Total plans for twelve months (April 1 to March 31, 1922)	1,355
Charts received and recorded	95
Photographs received and recorded	267
Specifications and bills of materials written	65

Publications

During the fiscal year 84 Notices to Mariners were issued covering 240 subjects. The following may be especially noted:—

Ice Patrol Service, Transatlantic Steamship Routes.

List of Radiotelegraph Stations transmitting weather, ice and other reports.

Seaplane Stations established, Warning to Mariners.

Description of, and rules for navigating new Port Huron channel.

Description of new flags to be flown by German and Austrian merchant ships.

List of harbour and fishing lights on Atlantic coast of Canada.

List of buoys in lower Detroit river.

Description of improvements to navigable channels by dredging done by Department of Public Works.

Notices relating to waters outside of Canada were issued covering items relating to Newfoundland, Pacific waters of the United States, as well as notices relating to transatlantic subjects.

The annual edition of the "List of Lights and Fog Signals," in three sections, was issued.

Special Work

In addition to the general work of this office, experiments were carried out by Mr. de Miffonis, of this branch, for which purpose the services of the physics laboratory at Queen's University were made available to the department through the kindness of the authorities in charge.

While not yet completed, interesting and important information has been obtained in connection with the optical properties of the various illuminants used in the Canadian lighthouse service. Studies have also been made in connection with the various metallic reflecting surfaces available for lighthouse purposes, and the desirability of replacing incandescent oil burners by incandescent electric bulbs, as already indicated, has become more apparent.

Ice-breaking

The five-year contract with the Great Lakes Transportation Company, to keep the harbours at the head of lake Superior open for navigation until December 17, in each year, and to open them in the spring, as soon as the canal at Sault Ste. Marie is open for navigation, is still in force.

Removal of Obstructions to Navigation

Montague, P.E.I.	The schooner *"Alph B. Parker"* which was wrecked near Montague, was removed by Jas. Mahar under contract.
Inverness harbour	The schooner which sunk in the channel was removed by the owner, J. J. Rankin.
Newport Centre	The masts of a burned schooner which were a menace to navigation, were removed by the Fisheries boat.
Berthier channel	The barge *"Leopold"* was wrecked in channel and removed by the Department at the owners' expense.
Becancour river	The sailing scow *"C. Bibeau"* which was a menace to navigation was subsequently broken up.
Collingwood	The *"City of Meaford"* which was a menace to navigation was removed by the York Construction Company
Shoal lake, Kenora	An obstruction in Shoal lake was removed.

Maintenance and Repairs to Wharves

The following is a list of wharves where repairs were attended to by this branch:

Nova Scotia.—
Babins cove,
Baddeck,
Port Clyde,
Amherst point,
Meteghan river,
Shag harbour,
Whitewaters,
Eastern harbour.

New Brunswick.—
Dipper harbour,
Edgetts Landing,
Hatfield point,
Lorneville,
St. Martins.

Prince Edward Island.—
Brudenell,
Cardigan,
Georgetown,
Grand river,
North Cardigan,
Sturgeon wharf,
Tignish,
Vernon river.

Quebec.—
Anse St. Jean,
Baie St. Paul,
Berthier-en-bas,
Carleton,
Grand river,
New Carlisle,
Paspebiac,
Perce,
Roberval,
St. Alphonse,
Ste. Ann des Monts,
St. Irenee,
St. Thomas de Montmagny,
Trois Pistoles.

Montreal—
Fassett,
Montebello,
Varennes,
Victoria pier.

Ontario—
Maganatawan,
North Bay,
Rosseau.

British Columbia—
Powell river,
Royston,
Sidney,
Massett,
Stewart.

Nova Scotia

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Battery point .. .. Provision and installation of two reflectors.
Cape Freels .. .. Repairs to dwelling and dam.
Cape Race, Nfld. .. .. Repairs to roof of lantern, fog alarm and passage way.
Glace bay .. .. Erection of mast for front light, moving back tower and installation of headlight lantern for front light.
Guion island .. .. Installation of a Reliance clock mechanism.
Harbour island .. .. Installation of a larger Aga lighting apparatus.
Liscomb .. .. New lighthouse constructed by G. Y. Grant & Sons, under contract. Lantern dismantled and erected in new tower and installation of an oil pumping plant.
Little Hope .. .. Completion of repairs to crib.
Mauger beach .. .. Repairs to protection work.
Musquodoboit .. .. Repairs to pier.
Pearl island .. .. Repairs to dwelling.
Sydney bar .. .. Repairs to protection work.
Wedge island .. .. Repairs to dwelling, lighthouse, boathouse, cribwork protection and slipway.

New Brunswick

NEW AIDS TO NAVIGATION

Kelly cove .. .. Pole light with anchor lantern.
St. John .. .. Installation of an electric fog bell on end of pier No. 16.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Brier island .. .. Steam fog alarm plant replaced by installation of two 10-h.p. engines and two 8 in. by 8 in. compressors.
Chamcook .. .. Installation of an unwatched light using Aga system.
Ganent rock .... Repairs to concrete posts, erection of mast, etc.
Green island .. .. Repairs to keeper's dwelling.
Lepreau .. .. Dwelling erected under contract by W. F. Fitzzgerald.
Letite .. .. Type "B" diaphone and three pistons.
Long Eddy point .. .. Type "F" diaphone with pistons.
Parrsboro, N.S. .. .. Stringers and posts on protection wall renewed.
St. John Agency .. .. Repairs to nineteen oil tanks.
St. John Agency .. .. Converting two submarine bell buoys into oil tanks.
St. John Agency .. .. Making four oil tanks of two tanks.
St. John Agency .. .. Conversion of two submarine bell buoys.
St. John Agency .. .. Lamp testing apparatus removed from Reid building to Post Office building and repairs to Reid building.
St. John Agency .. .. Conversion of one submarine bell buoy float.
St. John Agency .. .. Repairs to electric lighting system.

Prince Edward Island

NEW AIDS TO NAVIGATION

Cote d'Or	Establishment of 25-foot pole light and Piper pressed lens lantern.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Amet island	Installation of Aga lighting system.
Amherst island	Land purchased for road and construction of same.
Amherst island	The clock mechanism replaced by an improved Chanteloupe clock and apparatus improved by installation of triple flash reflector.
Belle Isle N. End	Repairs to building and landing and electric lighting of fog alarm building.
Belle Isle S. End	Installation of engine, compressor and repairs to dwelling, lighthouse, stable and sailors' home.
Bird rocks	Repairs to lighthouse, wharf, fog alarm building, trestle work, etc.
Bird rocks	Erection of new dwelling.
Cape Bauld, Nfld.	Road bridge and culverts replaced, barn reshingled, tower replastered, lantern reglazed, etc. Work to be completed next season.
Cape Ray	Installation of an electric lighting plant.
Charlottetown	Repairs to Departmental wharf.
Chatham	Repairs to buoy derrick.
Escuminac	Repairs to concrete protection work.
Fox island	Erection of two poles with sheds at base.
Little Sands	Construction of an oil shed.
Margaree	Installation of illuminating apparatus.
North Rustico	Repairs to main light, breakwater, and outer range light.
Point Rich	Repairs to chimney.
St. Mary island	Completion of installation of engine, etc. (work started last year).
St. Peters	Two temporary pole lights.

Quebec

NEW AIDS TO NAVIGATION

Papinachois river	Two headlight lanterns.
Pentecote river	Establishment of range pole lights.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Cap de Rabast	Installation of an oil tank.
Cap de Rosiers	Installation of 55 mm. Diamond burner.
Cape Dogs	Repairs to dwelling, boat, derrick, etc.
Charleton point	Installation of an oil tank.
Father point	Installation of new fog alarm machinery, type "F" diaphone, etc.
Goose lake	Repairs.
Gros Pin	Repairs to fence.
Grosse Roche	Installation of an unwatched light (Aga system).
Lower Traverse	The trawler *"St. Eloi"* fitted out as a lightship.
Paspebiac	Erection of steel skeleton tower under contract by John Le Blanc.
Point Noire	Front tower lantern rebuilt and light improved.
Point Peter	Repairs to tower and dwelling. (To be completed next year.)
Quebec	Extensive repairs to Henry and Allan wharves.
Quebec agency	Repairs to engine.
Table head	Installation of a derrick and oil tank.
Upper Traverse pier	Extensive repairs to pier.

Montreal Agency

NEW AIDS TO NAVIGATION

Nicolet river	Erection of range lights showing red lights.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Bloody island	Construction of concrete pier.
Chambly basin	Reconstruction of front light and installation of Piper headlight lantern.
Dorval	Installation of new burner.
Gentilly	Consrtuction of a concrete pier surmounted by concrete lighthouse.
Montreal Agency	Repairs to scows *"Quebec"*, *"Parry Sound"*, *"Acetylene"*, *"Sarah"*, *"Adelard"*, etc.
Montreal Agency	Construction of ten steel ice buoys under contract by Messrs. Robb, Amherst, N.S.
Montreal Agency	Repairs to pile driver hoist and repairs to concrete mixer.
Point Cadieux	Installation of a Pintsch light.
Point Claire	Installation of a new burner.
Ste. Anne de Bellevue	Light rebuilt.
Sorel	Repairs to test roomt.
Sorel	Transforming three buoy floats to take one large accumulator in place of four small ones.
Vaudreuil	Back beacon rebuilt.

Ontario

NEW AIDS TO NAVIGATION

Athabaska river (Alberta)	Buoys and beacons established in Mackenzie and Athabaska rivers and connecting waters.
Boyd island	Provision of hand fog horn.
Cape Robert	Provision of hand fog horn.
Port Weller	Installation of electric light and electrically operated bell.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Par Point Lightship	Mooring chains installed, etc.
Barriefield Common	Installation of system for electric lighting ranges.
Burlington bay	Installation of gasoline engine.
Byng Inlet	Repairs to lighthouse.
Cabot head	Repairs to tower.
Cobourg	Installation of two 8-i-nch pressed lens lanterns, type "B", diaphone, with pistons, etc., also the lighting of the centre pier.
Cove island	Stone dwelling and tower repointed.
Davieux island	Old oil shed converted into a boathouse.
Gereaux island	Repairs to lighthouse.
Griffith island	Tower repointed and repairs to deck of same.
Gros Cap reef	Trawler *"St. Julien"* being prepared for a lightship.
Jackshaw shoal	Cribwork, etc., repaired.
Key harbour	Beacons at Dead Keefer and Dokis island rebuilt.
Lyal island	Repairs to lantern deck and boathouse.
Mississagi strait	Repairs.
Nottawasaga island	Repairs to tower dwelling, etc.
Parry Sound	Repairs to marine wharf.
Pie island	Installation of Aga lighting system.
Point Clarke	Installation of new revolving pedestal and general remodelling.
Port Stanley	Beacon electrically lighted and installation of 5th order lens.
Prescott	Repairs to scow also painting and outfitting *"Marifiscan."*
St. Anicet	Installation of an Aga light.
South Baymouth	Repairs to back range tower.
South East Bend	Repairs to pile beacons.
Stokes bay	Repairs to back range tower.
Stribling point	Repairs to tower.
Thames river	Repairs to tower.
Thunder cape	Repairs to dwelling, new smoke box, etc.
Tiffin	Piper lantern provided.
Trenton	Pole with light replaced.

British Columbia (Victoria Agency)

NEW AIDS TO NAVIGATION

Dog island	Establishment of an Aga beacon.
Ildstad island	Establishment of an Aga beacon.
Rhinoceros point	Establishment of an Aga beacon.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Cape Mudge	Tower scraped and painted.
Carmanah	Erection of reinforced concrete tower under contract by J. Charlesworth, Hodgson, King & Marble. (Will be completed next year.)
Denman island	Installation of an Aga lighting system.
Entrance island	Light improved by installation of 4th order flashing apparatus with mercury bath.
First narrows	Repairs to protection work.
Frasermouth	Dolphins relocated to suit changed condition of channel.
Fraser river, N. Arm	Dolphin rebuilt.
Gallows point	Repairs to approach to fog bell.
Pachena	Repairs to aerial tramway and installation of power hoist.
Patey rock	Installation of an Aga light.
Yellow island	Work started on the erection of the back light tower.

British Columbia (Prince Rupert Agency)

NEW AIDS TO NAVIGATION

Outer island	Establishment of an Aga beacon.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS

Green island	Repairs to slipway, sidewalk, and chimney cowl.
Inverness beacon	Beacon rebuilt.
Prince Rupert	Repair to wharf.
White point	Beacon rebuilt.

COMMISSIONER OF LIGHTS' BRANCH

Report of J. G. Macphail, B.A., B.Sc., M.I.C.E., Commissioner of Lights

The principal work performed during the fiscal year ended March 31, 1922, has been an extension of the buoy and beacon services, together with the maintenance of lights and other aids to navigation throughout the Dominion, and the maintenance and inspection of public wharves. The operations of this branch are set forth in tabular form in two inclosures.

INCLOSURE No. 1.—Statement, by districts, showing the number of lights of the several orders, lightships, lightkeepers, fog signals, buoys, submarine bells, etc.

—	1st order lights	2nd order lights	3rd order lights	4th order lights	5th order lights	6th order lights	7th order lights	Gas beacons	Pressed lens lights and other minor types	Catoptric lights	Electric lights	Total	Lightships	Lightkeepers	Diaphones	Fog guns and bombs	Fog horns and trumpets
New Brunswick		4	3	23	20	26	59	3	4	11	6	159	1	156	24	1	1
Nova Scotia	3	3	8	32	15	18	39	3	13	45	5	184	1	169	17	1	.....
Prince Edward Island	2	7	9	33	5	11	41	5	11	105	2	231	.....	156	12	1	.....
Quebec	3	1	11	21	11	17	42	6	23	88	15	238	4	190	22	4	.....
Hudson Bay and Strait	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	10	.....	.....	.....	.....	.....
Montreal	.....	.....	.....	7	7	6	19	6	26	161	7	239	.....	158	.....	.....	.....
Prescott	.....	.....	3	14	5	6	18	19	5	9	3	82	.....	42	10	.....	.....
Parry Sound	.....	5	10	23	14	11	54	31	32	63	21	264	2	150	25	.....	.....
Kenora	.....	.....	.....	.....	.....	.....	3	.....	2	2	2	9	.....	6	.....	.....	.....
Manitoba	.....	.....	.....	2	3	.....	4	.....	1	5	1	16	.....	10	.....	.....	.....
Victoria	3	1	3	7	7	1	11	57	10	6	18	124	1	66	19	.....	.....
Prince Rupert	1	.....	3	3	1	.....	3	30	2	3	.....	46	.....	15	6	.....	.....
Total	12	21	50	165	88	96	293	170	129	498	80	1,602	9	1,118	135	7	1

—	Fog whistles	Sirens	Fog bells	Hand fog horns	Hand fog bells	Total fog signals	Fog signal stations only	Gas buoys	Gas and whistling buoys	Gas and bell buoys	Whistling buoys	Bell buoys	Total gas and signal buoys	Lightship submarine bells	Total submarine bells	Lighted spar buoys, floats and dolphins	Unlighted buoys	Stakes, bushes and balises	Unlighted tripods, floats, dolphins, spindles and beacons
New Brunswick	1	.....	11	22	.....	60	7	3	13	3	8	28	55	1	1	.....	562	508	63
Nova Scotia	1	.....	2	44	.....	65	2	6	20	11	16	43	96	1	1	.....	1,002	11	10
Prince Edward Island	.....	1	.....	9	.....	23	.....	3	4	4	3	12	26	.....	.....	.....	894	1,657	6
Quebec	4	.....	.....	22	4	56	1	61	.....	8	.....	1	70	3	3	1	266	100	41
Hudson Bay and Strait	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montreal	.....	.....	.....	.....	.....	.....	.....	100	.....	.....	.....	.....	100	.....	.....	3	580	170	237
Prescott	.....	.....	4	5	.....	19	.....	38	.....	1	.....	1	40	.....	.....	1	546	.....	5
Parry Sound	2	.....	4	32	.....	63	.....	35	4	11	.....	2	52	1	1	26	557	64	56
Kenora	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	439	.....	.....
Manitoba	.....	.....	.....	4	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	.....	.....
Victoria	.....	.....	11	5	.....	35	1	1	4	4	2	3	14	1	1	16	170	.....	87
Prince Rupert	.....	.....	3	5	.....	14	2	2	7	2	.....	.....	11	.....	.....	.....	33	.....	25
	8	1	35	148	4	339	13	249	52	44	29	90	464	7	7	47	5,091	2,510	530

INCLOSURE No. 2.—Statement, by localities, giving the number of unlighted buoys, stakes, bushes, balises, tripods, floats, dolphins, spindles and beacons maintained throughout the Dominion during the fiscal year ended March 31, 1922.

NEW BRUNSWICK DISTRICT

Locality and Number of Stakes, Bushes, etc.	No. of buoys
Advocate harbour, N.S.	9
Alma, Little Salmon river, N.B.	3
Apple river, N.S.	8
Argyle river and sound, N.S	10
Avon river, .N.S	.4
Bear river, N.S.	7
Beaver harbour, N.B.	4
Big Duck island, Grand Manan	1
Blacks harbour, N.B.	3
Bliss island, N.B.	1
Brier island, N.S.	1
Buck rock, Grand Manan	1
Calf island bay, N.S.	5
Campobello, N.B.	10
Chambers rock, N.B.	1
Chamcook harbour entrance, N.B.	1
Chance harbour, N.B.	2
Chebogue, N.S.	1
Clark harbour, N.S.	17
Cockerwitt pass and Woods harbour, N.S., 1 spindle	17
Cumberland basin, N.S.	2
Deadman's head, L'Etang harbour, N.B.	1
Deer island, N.B., 12 spindles in vicinity of island	
Digby and Annapolis, N.S.	15
Digdequash, N.B.	6
Dipper harbour, N.B.	5
Dochet island, St. Croix river	1
Freeport, N.S., 1 beacon	3
Goose bay, N.S., 35 stakes	8
Grand lake, N.B., bushes	32
Grand Manan, bay of Fundy, 2 spindles, 1 beacon	17
Grand passage, N.S., 2 spindles	5
Grassy island, St. John river, 18 stakes	7
Grindstone island bar	1
Gull ledge, N.S.	1
Hatfield point, St. John river, 60 bushed stakes	1
Indian point bar channel, Grand lake, 10 bushed stakes	3
Johns ledge, N.S.	1
L'Etang, N.B., 1 spindle	
Letite, 1 spindle	
Letite, L'Etang and Bliss harbour, N.B.	14
Little Wood island	1
Lorneville, N.B., 1 spindle	1
Magaguadavic, N.B.	13
Man O'War rock, L'Etang harbour, N.B.	2
Maquapit and French lakes, N.B., 57 stakes	13
Mink island, L'Etang harbour, N.B.	1
Musquash, N.B.	7
Old Man rock, N.S.	1
Old Woman rock, N.S.	1
Owls head, N.S.	1
Ox head ledges, N.B.	3
Parrsboro, N.S.	6
Pea point, L'Etang harbour, N.B.	1
Pease island, N.S.	1
Perry point, Kennebecasis river, N.B., 12 bushes	
Petitcodiac river	12
Pubnico, N.S., 4 stakes	17
Quaco, N.B.	1
Roaring Bull rock, N.S.	1
Robinson's ball station, Wood harbour, N.S.	2
St. Andrews, N.B., 3 stakes	17
St. Croix river, N.B.	9
St. John harbour, N.B.	3
St. John river, N.B., 150 stakes and bushes	87
Salmon river, N.B., bushing	15
Schooner rock, N.S.	1
Scotchtown, N.B.	6
Shag harbour, N.S.	17
Shampiers wharf, N.B., 15 stakes	2
Shulee, N.S.	8
Stay point, Lepreau river	1
Tusket river, N.S.	9
Tusket Wedge, N.S., 3 spindles	17
Tynemouth creek, N.B.	4
Walton harbour, N.S.	1
Washadamoak lake, N.B., 144 bushes	2
West isles, N.B., 4 spindles	23
Weymouth, N.S.	19
Yarmouth, N.S., 34 dolphins	7

NOVA SCOTIA DISTRICT

Locality and Number of Stakes, Bushes, etc.	No. of buoys
Arichat, West Arichat and Janvrin, C.B.	19
Barrington, N.S., 7 dolphins	45
Beaver harbour, N.S.	8
Beaver island, Nova Scotia, southeast coast	1
Beaver narrows, C.B.	2
Big Lorraine (Lorembec harbour), C.B.	3
Birchtown, N.S.	5
Black rock shoal, off Dover, N.S.	1
Blandford, N.S.	5
Boulaceet, Gillies point, C.B.	1
Canso and St. Andrews passage, N.S., 20 winter buoys	32
Canso harbour entrance, N.S.	3
Cape Negro and Northeast harbour, N.S.	17
Chester and Gold river, N.S.	28
Christmas island and Barra strait, C.B.	11
Clyde river, N.S.	5
Coddle harbour, N.S.	6
Cook's Cove (Toby cove), N.S.	4
Country harbour, N.S.	2
Crow harbour, N.S.	3
Denny river, C.B.	3
Descousse and Lennox passage, C.B., 5 winter buoys	29
Devereux shoal, off Betty island, N.S.	1
Dover, N.S.	7
Dover harbour entrance, Gannet shoal, N.S.	1
East bay, Bras d'Or	5
East Chezzetcook and Petpeswick	10

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Continued*

NOVA SCOTIA DISTRICT—*Concluded*

Locality and Number of Stakes, Bushes, etc.	No. of buoys
East Dover, N.S.	7
Eskasoni, C.B.	6
Fourchu harbour, C.B.	15
Gegoggin, N.S.	7
Glace bay, C.B.	6
Great Bras d'Or, C.B.	7
Guysborough, N.S.	5
Habitants bay, C.B.	4
Halifax, N.S.	19
Harrigan cove, N.S.	3
Hautfond shoal, off cape Hogan, C.B.	1
Indian harbour, N.S.	4
Ingonish, South bay, C.B.	9
Isaac harbour, N.S., 9 winter buoys	13
Jeddore, N.S., winter buoys	11
Johnson harbour, C.B.	5
Ketch harbour, N.S.	6
Kieley cove, Blind bay, N.S.	4
Lahave, N.S.	9
Lahave river, between ridgewater and Dayspring	6
L'Ardoise, C.B.	5
Larry irver, N.S., 7 stakes	3
Liscomb, N.S., winter spars	7
Little Bras d'Or harbour, C.B.	18
Little Dover, N.S.	9
Little Liscomb harbour, N.S.	4
Little Lorembec (Little Lorraine), C.B.	5
Little narrows, C.B.	10
Liverpool, N.S.	10
Lockeport, N.S.	14
Louisburg, C.B., 6 winter buoys	8
Lunenburg, N.S.	8
Lunenburg, back cove, N.S.	9
Lunenburg, middle south, N.S., 6 winter buoys	16
Mahone bay, N.S., 1 beacon	12
Mainadieu, C.B.	5
Marble mountain, C.B.	5
Marie Joseph and Ecum Secum, N.S., 11 winter buoys	16
Martins brook, N.S.	6
McKinnon harbour, C.B.	6
McNab cove, C.B.	2
McVarish shoal and Campbell point, Bras d'Or, C.B.	4
Monsillier passage, C.B., 4 stakes	6
Musquodobit, N.S.	15
New harbour, N.S.	1
Orangedale, C.B.	3
Orpheus, off Green island, N.S.	1
Pennant harbour, N.S.	11
Petitdegrat, C.B., 6 winter buoys	18
Petpeswick inlet, N.S.	1
Pollock shoal, off West Ironbound island, N.S.	1
Pope harbour, N.S.	4
Port Bickerton, N.S., 3 winter buoys	5
Port Felix, N.S., 1 staff	11
Port Latour, N.S., 1 spindle	16
Port L'Hebert, N.S.	8
Port Medway, N.S.	6
Port Morien, C.B.	1
Port Mouton, N.S.	9
Pringle harbour, C.B.	6
Prospect, Lower, N.S.	10
Prospect, Upper, N.S.	4
Ram rock, Jordan bay, N.S.	1
River Bourgeois, C.B.	6
Rose Bay, lower, N.S.	6
Roseway, N.S.	5
St. Ann, C.B.	12
St. Margaret bay, N.S.	6
St. Mary river, N.S., winter buoys	11
St. Mary river to Sherbrooke, N.S.	18
St. Peter bay, C.., 4 winter buoys	17
St. Peter inlet, C.B.	12
Sambro, N.S.	29
Shad bay, N.S.	4
Shag bay, N.S.	8
Sheet harbour, N.S., 5 winter buoys	9
Shelburne, N.S., 3 winter spars	5
Ship harbour, lower, N.S., 6 winter buoys	11
Ship rock, strait of Canso	1
Slaughenwhite ledge, Hubbard cove, N.S.	1
Sober island to Ecum Secum, N.S.	22
Spry bay, N.S.	4
Stoney island, Baddeck, C.B.	1
Sydney harbour, C.B.	8
Tancook island, N.S.	3
Tangier, N.S.	7
Terence bay, N.S.	3
Three Fathom harbour, N.S.	5
Tor bay, N.S.	21
Voglers cove, N.S.	6
Walverville, C.B. (Inhabitants harbour)	3
Washaback river, C.B.	7
West bay, C.B.	5
West bay, C.B. (Smith island)	1
West Chezzetcook, N.S.	7
West Dublin, N.S.	12
Whitehaven, N.S., 5 winter buoys	8
Whycocomagh, C.B.	4

PRINCE EDWARD ISLAND DISTRICT

Aldouane, N.B., 42 bushes	5
Amherst harbour, Magdalen islands	8
Baie du Vin, Huckleberry gully and channel, N.B., 44 stakes and bushes	20
Baie Verte and Port Elgin, N.B., 30 stakes	6
Bartibog and Black rivers, N.B., 12 bushes	1
Bay Fortune, P.E.I.	3
Beach Point, P.E.I.	3
Belle river, P.E.I.	3
Black brook, Miramichi river	3
Brae harbour, P.E.I.	5
Brudenell river, P.E.I.	5
Brule, N.S.	9
Buctouche, N.B., 34 stakes	22
Buctouche river, N.B., 260 bushes	
Cape Jack ledges, N.S.	1
Cape Tormentine	2
Cardigan, Lower, P.E.I., 2 winter buoys	7

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Continued*

PRINCE EDWARD ISLAND DISTRICT—*Continued*

Locality and Number of Stakes, Bushes, etc.	No. of buoys
Cardigan, Upper, P.E.I.	20
Caribou, N.S.	6
Cascumpeque, P.E.I., 14 stakes	15
Charlottetown, P.E.I.	9
Cheticamp, N.S.	14
Chimney corner, C.B.	3
Church rock, Magdalen islands	1
Cocagne, N.B., 30 stakes	11
Covehead, P.E.I.	3
Crapaud, P.E.I., number of stakes	11
East river, P.E.I., 15 stakes, 8 bushes	14
Egmont bay, north, P.E.I., 19 stakes	9
Egmont bay, south, P.E.I., 13 stakes	3
Entry island and Amherst island passage (Magdalen islands)	6
Georgetown and St. Marys bay, P.E.I., 3 winter spars	19
Goose and Palmer harbours, P.E.I.	5
Grand Entry, Magdalen islands	17
Grand Etang, C.B.	4
Grandigue, N.B., 30 stakes, 20 bushes	2
Grand river (Boughton river), P.E.I., 80 bushed stakes, 1 beacon	12
Grand river, off cape Sixteen, Malpeque bay, P.E.I.	8
Grand Tracadie, P.E.I.	4
Great Shemogue, N.B.	9
Grindstone reef, Magdalen islands	1
Harbour au Bouche, N.S., 6 stakes	4
House harbour, Magdalen Islands	12
Judique, C.B.	1
Kouchibouguac and Black Lands gully, N.B., 150 bushes	15
Little channel, P.E.I.	3
Little Shemogue, N.B., 2 poles	5
Mabou, C.B., stakes	20
Malpeque and Darnley, P.E.I., 5 stakes	22
Margaree harbour, C.B., 7 stakes	3
Merigomish, N.S., stakes	6
Meule rock, Magdalen islands	2
Miminegash, P.E.I.	6
Miramichi bay and river, 12 bushes, 12 winter spars	40
Miramichi bay, Grandoon channel	20
Miramichi river, northwest branch	14
Miramichi river, southwest branch	9
Miscouche, P.E.I.	1
Montague river, P.E.I., 10 stakes	7
Murray harbour and rivers, P.E.I., 25 stakes, 1 winter spar	32
Napan river, N.B., 24 bushes	3
Neguac, N.B.	19
New London, Fernch river, P.E.I., 15 stakes	8
Northport, N.S.	12
North river, P.E.I., 14 stakes	3
Orwell and Vernon rivers, P.E.I., 36 bushes, 4 beacons	3
Pictou, N.S.	11
Pictou harbour (East river), N.S., 53 bushes	
Pinette, P.E.I., 24 bushes	5
Pokemouche, N.B., bushes	6
Port Borden	3
Port Hill, P.E.I.	12
Port Hood, C.B., 2 winter buoys	5
Pownall, P.E.I., 10 poles	9
Pugwash, N.S.	8
Richibucto, N.B.	38
Richibucto (McBeath channel) 20 bushes, 18 stakes	
Richibucto river, Rexton and Browns yard, N.B.	30
Rifleman reef, P.E.I.	1
River John, N.S., stakes	3
River Phillip, N.S.	6
Rollo bay, P.E.I.	3
Rustico, P.E.I., 30 bushed stakes	6
St. Charles river, (Aldouane river), N.B., 60 bushes	
St. Louis, N.B., 70 bushes	9
St. Louis river, N.B., 54 bushes and stakes	
St. Peter harbour, P.E.I., 6 stakes	5
Sandy Hook, Magdalen islands	1
Savage harbour, P.E.I.	2
Shediac, N.B., 5 winter buoys	14
Shippigan, N.B., 27 pickets, 30 bushes, 1 beacon	27
Souris, P.E.I.	4
Stanley and Bayfield channel, Southwest river, Clifton bridge, P.E.I., 14 stakes	9
Summerside, P.E.I., 10 stakes	10
Tabusintac, N.B.	20
Tatamagouche, N.S., 46 bushed stakes	18
Terras shoal, P.E.I.	1
Tidnish, N.S., stakes	5
Tracadie, north gully, N.B., 100 bushes and stakes	12
Tracadie, south gully, N.B., 30 bushes	5
Wallace, N.S., 33 stakes	11
West point, P.E.I.	4
West river, P.E.I., 65 stakes	8
Wood island, P.E.I.	4

QUEBEC DISTRICT

Anse a Beaufils, P.Q.	1
Anse aux Gascons, P.Q.	1
Barachois de Malbaie, P.Q.	1
Bathburst, N.B.	31
Beaudry shoal, Gaspé basin, P.Q.	1
Beauport, P.Q.	3
Bonaventure, P.Q.	7
Cap Chat, P.Q.	1
Cape Cove, P.Q.	1
Cape d'Espoir, P.Q.	1
Caraquet, N.B.	16
Caraquet to Mizonette, N.B.	3
Carleton point, P.Q.	1
Echourie rock (Serpent reef), P.Q.	1
Fox river, P.Q.	1
Grand Anse, N.B.,	4
Gros-cap-aux-Os, P.Q.	1
Little River East, P.Q.	1
Little Shippigan (Miscou gully), N.B.	4
Maria, P.Q.	2

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Continued*

QUEBEC DISTRICT—*Concluded*

Locality and Number of Stakes, Bushes, etc.	No. of buoys
Matane, P.Q.	2
Miscou, N.B.	8
Mistassini river, 50 balises	13
Moisie river, P.Q.	2
Natashkwan, P.Q.	4
New Richmond, P.Q.	3
Nouvelle roads, P.Q.	2
Paspebiac, P.Q.	1
Perce, P.Q.	2
Peribonka river, 35 balises	8
Petit Rocber, N.B.	1
Point St. Peter, P.Q.	1
Port Daniel, P.Q.	1
Portneuf-en-Bas, P.Q.	9
Restigouche river and Chaleur bay	22
River St. Lawrence, north channel, Orleans island	13
River St. Lawrence ship channel, 33 beacons, 8 spindles, 7 steel winter spar buoys	32
Roberval	6
Ste. Anne river, P.Q.	1
St. Godfroy, P.Q.	1
St. Michel de Bellechasse, P.Q.	4
St. Simon bay, N.B., 15 stakes	6
St. Thomas de Montmagny, P.Q.	8
Saguenay river, vicinity of Chicoutimi, P.Q.	33
Saguenay river, Ha Ha bay	1

MONTREAL DISTRICT

Ottawa river district	87
Richelieu rapids, bushes	
Richelieu river	68
Rideau river, 84 floats, 25 tripods	18
River St. Lawrence	322
Rivière des Prairies, P.Q.	11
St. Francis river, P.Q., 80 balises, 12 day beacons	
St. Maurice river, Grandes Piles to Latuque, P.Q., 106 day beacons	74
Yamachiche river, P.Q., 30 balises, 4 day beacons	
Yamaska river, P.Q., 60 balises, 6 day beacons	

PRESCOTT DISTRICT

Bay of Quinte	17
Cataraqui river	3
Kingston	9
Lake Ontario, Melville shoal	1
Lake Ontario, N.E. of Snake island	1
Lake Ontario, S.E. end of Snake island shoal	1
Lake Ontario, S.W. end Snake island shoal	1
Lake Ontario, off Long Point, Wolfe island	1
Lake Ontario, E. of Presqu'ile light	1
Lake St. Francis	29
Murray canal and Presqu'ile bay	25
Napanee river	17
Picton harbour	6
River St. Lawrence, 5 beacons	87
Telegraph narrows	10
Trent canal, (maintained for this department by Department of Railways and Canals	317
Trenton harbour	15
Whitby	5

PARRY SOUND DISTRICT

Ann Long bank, Georgian Bay	1
Bar point, Georgian bay	1
Bad Neighbour shoal, entrance to Georgian bay	1
Bernard rock, Georgian bay	1
Blind River, north channel, lake Huron	6
Burke shoal, lake Superior	1
Byng inlet channel, Georgian bay, 6 beacons	27
Campana shoal, Georgian bay	1
Campbell rock, Georgian bay	1
Cape Hurd, lake Huron	3
Clapperton channel, north channel, lake Huron, 1 beacon	8
Cloud Bay, lake Superior	2
Collingwood, Georgian bay	13
Dawson rock, Georgian bay	1
Detroit river	30
Fitzroy Harbour, Ont.	19
Fort William, lake Superior	15
Goderich, lake Huron	7
Jackson shoal, Georgian bay	2
Kennedy bank, Georgian bay	1
Key harbour channel, Georgian bay, 6 beacons	24
Killarney harbour, Georgian bay	3
Lake Couchiching and narrows, 11 bushes	8
Lake Simcoe	5
Lake Timiskaming, North Timiskaming, 20 stakes	
Lake Timiskaming, Ville Marie channel	7
Lake Timiskaming, Wabi creek, 5 stakes	
Lionshead harbour, Georgian bay	1
Little Current, north channel, lake Huron	27
Mary Ward ledges, Georgian bay	4
Meaford harbour, Georgian bay	3
Michipicoten island (Quebec harbour) lake Superior	6
Midland and Victoria harbours, Georgian bay	5
Morden rock, Georgian bay	1

INCLOSURE No. 2.—Statement, by localities, of unlighted buoys, etc.—*Concluded*

PARRY SOUND DISTRICT—*Concluded*

Locality and Number of Stakes, Bushes, etc.	No. of buoys
Mutton island, lake Superior	1
Northeast shingle, Georgian bay	1
Ottawa river, above Pembroke, Ont.	30
Owen Sound channel, Georgian bay	4
Parry Sound ship channel, 2 beacons	20
Parry Sound to Waubaushene, Georgian bay, inner channel	116
Penetanguishene, Georgian bay	12
Pointe au Baril and Kennedy shoal, Georgian bay, 15 beacons	3
Port Arthur, lake Superior	19
Port McNicoll, Georgian bay	2
Port Rowan, lake Erie	10
River St. Clair, chenal Ecarte	1
River St. Clair, middle ground	1
River St. Mary and east end of lake Superior	19
River Thames, lake St. Clair	7
Rondeau, lake Erie	6
St. Joseph channel, lake Huron, 1 beacon, 5 winter buoys	25
Shebeshekong channel, Georgian bay, 22 day beacons	
Southampton, lake Huron	7
South Baymouth, lake Huron	4
Stokes bay, lake Huron	6
Sturgeon river, Monetteville and Cache bay, 28 bushed stakes	16
Victoria island, lake Superior	3
Wabuno channel, Georgian bay, 3 beacons	5
Wingfield basin, Georgian bay	4

KENORA DISTRICT

Lake of the Woods	345	Wabigoon lake	22
Rainy lake	27	Winnipeg river, White Dog to Kenora	24
Shoal lake	21		

MANITOBA DISTRICT

Black river, lake Winnipeg	6	Red river	17
Lake Winnipegosis, entrance Pine creek	7	Warren's Landing, lake Winnipeg	12

VICTORIA DISTRICT

Active pass, 1 beacon		Mud bay, Serpentine and Nicomeck'l rivers, 3 beacons, 27 dolphins	
Arrow lakes	22	Nanaimo harbour and Departure bay, 1 beacon	13
Baynes sound and approaches, 1 beacon	10	Okissolla channel, 3 beacons	
Broughton strait	1	Pender island canal	2
Burrard inlet and Vancouver harbour, 1 beacon	6	Pitt river	9
Clayoquot sound, 3 beacons	13	Prevost passage	1
Colburne passage, Colburne channel	2	Quatsino sound, 2 beacons	1
Courtenay river, 12 ile dolphins		Saanich inlet, 1 spindle, 1 beacon	2
Esquimalt harbour, 1 beacon	4	Satellite channel, 2 beacons	1
False narrows	2	Shushartie bay, 1 beacon	
Fraser river	38	Shute passage	1
Ganges harbour	2	Sidney channel, 1 beacon	6
Georgia strait, 2 beacons, 1 set range day marks	7	Stuart channel and approaches, 4 beacons, 1 pile dolphin	4
Haro strait, 1 beacon	2	Sutil channel, 1 pile dolphin	2
Houston passage	1	Trincomali channel and Porlier pass, 5 beacons	3
Johnstone strait, 4 beacons	2	Ucluelet harbour, 1 beacon	1
Juan de Fuca strait	1	Victoria harbour, 2 beacons	1
Kokshittle arm, Kyuquot sound	1		
Kootenay lake, northwest arm	7		
Malaspina strait, 3 beacons	2		

PRINCE RUPERT DISTRICT

Chatham sound, 1 beacon	7	Port Simpson	1
Fitzhugh sound, 1 beacon	1	Prince Rupert harbour, 1 beacon	2
Grenville channel, 3 beacons	1	Queen Charlotte islands, 4 beacons	1
Lama passage, 3 beacons		Seaforth channel, 3 beacons	
Metlakatla	9	Skeena river and passages, 5 beacons	2
Observatory inlet, 3 beacons	3	Tolmie channel, 1 beacon	
Porpoise harbour	6		

RIVER ST. LAWRENCE SHIP CHANNEL

REPORT OF V. W. FORNERET, B.A.Sc., M.E.I.C., SUPERINTENDING ENGINEER

GENERAL INFORMATION

The River St. Lawrence Ship channel commences at the lower exit of the Lachine canal and extends down as far as Father Point, a distance of 340 statute miles.

What may be properly called the "Ship channel," the contracted part of the river, commences at "The Traverse," 60 miles below Quebec, which is 220 miles from Montreal by South channel and by the uncompleted North channel 226 miles, Montreal to Goose cape.

This is divided into five divisions as follows:—

	Statute miles
Division I—Montreal to Sorel	45
" II—Sorel to Batiscan (not including lake St. Peter)	36
" III—Lake St. Peter	20
" IV—Batiscan to Quebec	59
" V—Quebec to Goose cape (North channel)	66
Total	226

DEPTH OF WATER IN THE SHIP CHANNEL, SEASON 1921

The lowest depth of water in the Ship channel during the season of 1921 was 30 feet 2 inches by the Sorel gauge; this was 1 inch higher than the previous season.

The following give the averages for each month during the season of navigation for 1920 and 1921:—

	May		June		July		Aug.		Sept.		Oct.		Nov.		Highest		Lowest	
	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.	Ft.	in.
1920	35	9	33	0	32	4	31	8	31	5	31	4	31	6	37	5	30	1
1921	35	6	32	9	31	10	31	4	30	10	31	4	31	6	37	8	30	2

It is surprising that notwithstanding the extreme dry season during the summer of 1921 that the water level did not go lower than the season of 1920.

It will be noted that the water level was lower during the first part of the season, but rose to that of 1920 after the month of September. This was probably due to the water level in the Ottawa river being higher after September, which gave a larger discharge into the St. Lawrence river.

SWEEPING OF CHANNEL

The Ship channel was swept as usual during the season by the sweeping steamer *Detector,* and no obstruction of a serious nature was found.

TIDAL SEMAPHORES

The tidal semaphores at Cap à la Roche (Deschaillons, P.Q.), which shows the available depth of water in the dredged channel, commenced operations on April 19, 1921. The tidal semaphore at Pointe Citrouille, which also shows the depth of water in the Cap à la Roche channel, commenced on same date. The Cap à la Roche and Pointe Citrouille semaphore stations are connected by special telephone lines to enable the operator at Cap à la Roche station to telephone every 3-inch rise or fall of tide to the operator at Pointe Citrouille.

The tidal semaphore at St. Nicholas, P.Q., which shows the available depth of water in the undredged St. Augustin channel, was put in operation April 19, 1921.

SYSTEM OF PERMANENT BEACONS FOR PLACING NAVIGATION BUOYS

Good progress was made during the season of 1921 in laying out and erecting permanent beacons for placing and checking the position of the channel buoys. This work, which is done by the Ship Channel staff, was completed between Longue Pointe and Lake St. Peter and also between Three Rivers and Pointe Citrouille. It is proposed to erect a certain number every season.

DREDGING OPERATIONS, SEASON 1921

The dredging operations on the River St. Lawrence Ship Channel for the season of 1921 were carried on with about the same plant as during the season of 1920, only one additional dredge bieng placed in commission.

The plant consisted of five dredges, one rock-breaker and the necessary attending plant of tugs, scows, stone-lifters, floating shop, etc.

Division I—Montreal to Sorel

Forsyth Shoal (Longueuil Curve), Montreal Harbour.—During the season of 1921, three dredges were employed for short periods deepening the channel from 30 to 35 feet at E.L.W. of 1897 and widening the curve on the north side in order to obtain a width of 850 feet.

The material removed consisted of hard pan, clay, stones, boulders and some very hard shale rock. The total number of cubic yards dredged amounted to 31,500, at a total cost of $58,384.75, or $1 85$^{34}/_{100}$ cents per cubic yard.

Vercheres to Contrecœur Channel.—One powerful elevator dredge was employed during most of the season deepening the channel from 30 to 35 feet at E.L.W. of 1897, the dredged material being clay.

The total number of cubic yards removed amounted to 291,750, at a total cost of $94,847.38, or 32$^{51}/_{100}$ cents per cubic yard.

Division II—Sorel to Batiscan

Ste. Anne Curve.—One dredge worked for part of the season deepening the channel from 30 to 35 feet at E.L.W. of 1897, the material being clay.

The total number of cubic yards removed amounted to 24,750, at a total cost of $11,653.90, or 47 $^{9}/_{100}$ cents per cubic yard.

Champlain Channel.—The channel was again carefully examined by the sweeping steamer *Detector* early in the season for 30 feet at E.L.W. of 1897 and several sand bars were found to have formed since it had been cleaned up the previous season. These were removed by a dredge before the low water season.

This is the only point in the ship channel between Montreal and Quebec where silting of any importance occurs.

The amount of material dredged amounted to 79,250 cubic yards, at a total cost of $48,734.51, or 61$^{49}/_{100}$ cents per cubic yard.

Division III—Lake St. Peter

No dredging was done in this division during the season of 1921.

Division IV—Batiscan to Quebec

Cap à la Roche Curve.—Two powerful elevator dredges and one rock-breaker were operated during most of the season, widening and deepening the channel to 30 feet at E.L.W. of 1897.

The widening on the north side is now completed and dredged to 30 feet at E.L.W. Owing to the deepening of the south half not being completed to 30 feet, the available depth in the channel is 27½ feet at ordinary low water.

There still remains some widening to be done on the south side of the channel at the lower end of the curve.

Notwithstanding the loss of time due to tides and passing ships and the extremely hard nature of the rock to be dredged, good progress was made. One stone-lifter was also occupied all season cleaning up boulders, and lifted several hundred.

The total number of cubic yards dredged during the season of 1921 amounted to 170,250, at a total cost of $152,218.66, or 89 40/100 cents per cubic yard.

Division V—Quebec to Goose Cape (North Channel)

The powerful hydraulic suction dredge *No. 8* (Beaujeu) was operated all season on the East Narrows (North channel). The number of cubic yards removed amounted to 569,600, consisting of sand, gravel, clay and stones, at a total cost of $98,821.54, or 17 35/100 cents per cubic yard.

The total number of cubic yards dredged in the River St. Lawrence Ship Channel during the season of 1921 amounted to 1,167,100, at a total cost of $464,660.74, or 39 81/100 cents per cubic yard.

Progress of Dredging Operations at the Close of Season of 1921

30-foot Project—

Total length of dredging done	(miles)	66·57
Total length of dredging yet to be done	"	1.43
Total number of cubic yards dredged		53,536,927
Total number cubic yards yet to be dredged		1,764,405

35-foot Project—

Total length of dredging done	(miles)	41.43
Total length of dredging yet to be done	"	47.56
Total number of cubic yards dredged		39,273,251
Total number of cubic yards yet to be dredged		27,800,690

The total cost from 1851 to the end of the fiscal year ending March 31, 1922, of the ship channel from Montreal to Father Point, including plant, shops, surveys, etc., is as follows:—

Dredging	$15,850,969 69
Plant, shops, surveys, etc.	8,574,300 77
Total	$24,425,270 46

The total amount dredged from 1851 to the end of the season of 1921 amounted to 119,336,133 cubic yards, the material varying from very hard shale rock to soft blue clay.

ACCIDENTS IN THE ST. LAWRENCE RIVER, SEASON 1921

Between Montreal and Quebec

June 1.—Canadian Government Merchant Marine steamer *Canadian Seigneur,* outward bound, went aground outside of channel in Montreal harbour. Was refloated; slight damage.

June 16.—SS. *Wathena,* outward bound, went aground on south side of channel between buoys 159M and 161M. Was refloated on the 18th; slight damage.

July 14.—Steamer *Mapledawn,* belonging to the Canada Steamship Company, and the Norwegian steamer *Rygja* collided at St. Croix bar; slight damage.

August 1—SS. *Mina Brea,* of the Imperial Oil Company, bound for Montreal, was beached one mile above Sorel on south side on account of leakage. This steamer had touched off Matane on way up. After being lightened, she proceeded up.

August 6.—SS. *Astrea,* inward bound, grounded near Longue Pointe, Montreal harbour, at 10.30 p.m. Was refloated again and left up at 6 a.m. on the 7th. Slight damage.

September 13.—SS. *Bellerby,* outward bound, went aground near Ile Ronde, Montreal harbour. Was refloated; slight damage.

September 13.—SS. *Wordsworth,* outward bound, went aground on north side of channel one mile above Pointe Citrouille Signal Station. Was pulled off by the ship channel tug *Emelia,* working in the vicinity, at high tide. No damage.

October 11.—SS. *Brumath,* belonging to the Gaspé Côtier Company, bound for Montreal, went aground on Bouchard island, below Verchères, P.Q. Was refloated; no damage.

November 14.—SS. *Cassandra,* Donaldson Line, bound for Montreal, went aground outside of channel off Pointe aux Trembles, Montreal harbour, early in the morning. Was refloated at 9.30 a.m.; slight damage.

Quebec to Father Point

August 18.—SS. *Maskinonge,* belonging to the Dominion Coal Company, and the Canadian Government Merchant Marine steamer *Canadian Recruit,* both bound for Sydney, N.S., collided off Stone pillars, below Quebec, one-half mile east of buoy 64Q. The *Canadian Recruit* was sunk (no lives lost) and the *Maskinonge* returned to Quebec as soon as weather cleared for examination and necessary repairs.

August 19.—Canadian Government Merchant Marine steamer *Canadian Warrior,* inward bound, stranded near Lower Traverse lightship. Floated off at high tide; slight damage.

September 14.—SS. *Innerton,* inward bound, stranded on Red island. Was refloated; slight damage.

October 4.—SS. *Sante Elena,* inward bound, stranded at Channel patch. Was refloated and returned to Quebec next morning; slight damage.

December 1.—SS. *Brant County,* outward bound from Quebec, went aground on Brulé bank, North channel. Floated at high tide, and returned to Quebec for examination; slight damage.

NOTE.—None of the above accidents between Montreal and Quebec and Quebec and Father Point can be attributed to any fault of the ship channel.

"MARINE SIGNAL SERVICE"

Signal stations have been established for the purpose of maintaining communication between ship and shore by means of flag signals.

This system of stations extends from St. John, N.B., Halifax, N.S., Cape Race, Nfld., and Belle Isle, up the gulf and river St. Lawrence and through the Great Lakes to Sault Ste. Marie, Ont.

Following is a complete list of stations:—

EAST OF QUEBEC

Name of Station	Location	Nautical miles from Quebec	Means of Communication
R.—Quebec	Custom House	0	Telephone
X.—St. Jean d'Orléans	Shore end of wharf	14	"
Crane Island	Lighthouse	32	"
L'Islet	100 yards east of church	40	Telegraph
Cape Salmon	Lighthouse	81	Telephone and telegraph
Rivière du Loup	Shore end of wharf	92	Telegraph
Father Point	Shore end of wharf	157	"
Little Métis	Lighthouse	175	"
Matane	"	200	"
Pointe des Monts	"	219	"
Cap Chat	"	234	"
Rivière à la Martre	"	260	"
Cape Magdalen	"	294	"
Fame Point	"	325	"
Cap des Rosiers	"	349	"
Cap d'Espoir	"	377	"
Point Maquereau	"	400	"
West Point, Anticosti	"	332	"
South West Point, Anticosti	"	360	"
South Point	"	415	"
Heath Point	"	438	"
Point Escuminac, N.B	"	462	"
Amherst Island, Magdalen Islands	"	481	"
St. Paul's Island, C.B	Main station	540	Telephone
Money Point, C.B., N.S	Lighthouse	537	"
Flat Point, N.S	"	575	Telegraph
Cape Ray, Nfld	"	553	"
Cape Race, Nfld	"	826	"
Point Amour, Labrador	"	673	Wireless telegraph
Belle-Isle	"	734	"
Camperdown, N.S	Near wireless station		Telephone
Halifax, N.S	The Citadel		"
Brier Island, N.S	Near lighthouse		"
Point Lepreaux, N.B	Lighthouse		"
Partridge Island, N.B	"		"
St. John, N.B	Custom House		"
Point Tupper, C.B			Telegraph
Scatari Island, C.B			"

WEST OF QUEBEC

Station	Location	Nautical miles from Quebec	Means of Communication
Bridge Station	Half mile above Quebec Bridge on south shore	6	Telephone
St. Nicholas	At tidal semaphore	12	"
Portneuf	In front lighthouse	31	"
Grondines	In old windmill tower	41	"
St. Jean Deschaillons	At tidal semaphore	45	"
Pointe Citrouille	In lighthouse	55	"
Three Rivers	Upper end of Bureau wharf	68	"
Sorel	Lower end of Government wharf	100	"
Bellmouth	About 500 ft. east Contrecoeur, low light	110	"
Cap St. Michel	Abreast east end Ile des Lauriers	125	"
Longue Pointe	Point between wharves	134	"
R.—Montreal	92 Notre-Dame St. East (La Sauvegarde Bldg.)	139	"

WEST OF MONTREAL

Station	Location	Nautical miles from Montreal	Means of Communication
R.—Lachine Canal	Lock No. 2	0	Telephone
R.—Lachine Canal	Lachine, in office Collector of Revenue	8	"
R.—Soulanges Canal	Cascades Point	21	"
R.—Soulanges Canal	Côteau Landing	33	"
R.—Cornwall Canal	Cornwall	62	"
R.—Galops Canal	Lift lock	99	Telegraph
R.—Welland Canal	Port Dalhousie	298	"
R.—Welland Canal	Port Colborne	321	"
R.—Soo Canal	Sault Ste. Marie	820	"

Stations marked thus "R" are reporting stations only and are not equipped for signalling purposes. Stations marked "X" are closed temporarily.

BRIEF SUMMARY OF WORK PERFORMED

1. Stations report movements of vessels to Montreal, Quebec, Sydney, Halifax or St. John.

2. Stations report weather conditions daily to Montreal, Quebec, Sydney, Halifax or St. John.

3. Montreal, Quebec, and St. John publish daily bulletins giving weather and ice conditions and movements of vessels.

4. Montreal and Quebec publish daily bulletins showing the depth of water at various points in the River St. Lawrence Ship Channel.

5. The Signal Service offices at Montreal, Quebec, and St. John are open day and night for the purpose of furnishing the public with information of shipping matters.

6. The telegraph system of the Department of Public Works on the north shore of the gulf of St. Lawrence report the movement of vessels engaged in the coasting trade in the Signal Service at Quebec.

7. The collectors of customs at all the seaports in the river and gulf of St. Lawrence, on the Atlantic coast, and in the bay of Fundy report the arrival and departure of vessels engaged in the overseas trade.

8. Lloyd's agents at Quebec are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the province of Quebec.

9. Lloyd's agents at St. John, N.B., are furnished daily with full information of the movements of vessels engaged in the overseas trade to and from ports in the Maritime Provinces.

ICE-BREAKING, 1921-22

REPORT OF H. B. MCLEAN, ENGINEER (RIVER ST. LAWRENCE SHIP CHANNEL)

I have the honour to submit the following report on the work of the ice-breaking steamers *Lady Grey* and *Montcalm* during the winter of 1921-22.

The weather conditions during the winter season of 1921-22 were about normal, not being exceptionally cold nor yet extremely mild. The ice bridge formed at Port St. Francis on December 16 and by December 26 the river was covered with ice from that point to Montreal. On January 24 the ice jammed at Portneuf and by February 10 had backed up to Port St. Francis. Below Portneuf there was open water the whole season.

The *Lady Grey* went to Three Rivers on November 27, to keep Port St. Francis open and to assist ships in the ice. No great difficulty was experienced. The last vessel, the ss. *Crowe,* passed outwards on December 9, and the last vessel inwards, the ss. *Clyde*, on December 14, the *Lady Grey* proceeded to Quebec, and took up her station there for the winter. While the *Lady Grey* was employed above, the *Mont-*

calm performed the same service below Quebec, giving assistance to ships at the Saguenay and outwards from Quebec.

The ice jammed three times at Quebec bridge and on several occasions large battures from above came down, but these jams and battures were all successfully broken up by the ice-breakers.

On January 24 an ice jam formed at Portneuf. Owing to unfavourable weather conditions, the *Lady Grey* was unable to go up until January 27, when it was found that the jam had reached such proportions that it was found advisable not to attempt to break it up until March.

The operation of opening the upper reaches of the river began March 2, at a point halfway between Portneuf and Cap Santé. One ice-breaker was detailed for work above, while the other remained at Quebec to break up any jams that might form and make certain that the other vessel would not be cut off from her base.

As was expected, the ice from Portneuf to Richelieu island was exceedingly heavy, but from Richelieu island upwards rather lighter than usual. Very satisfactory progress was made and on April 3 the *Montcalm* arrived at Three Rivers.

From April 3 to 13 the ice-breakers were engaged between Three Rivers and the foot of lake St. Peter. The lake ice began to move on April 8, and on April 13 the lake was clear, the *Lady Grey* proceeding upwards and reaching Montreal the same day.

On April 19, at the request of the Department of Railways and Canals, the *Lady Grey* proceeded to the foot of the Soulanges canal, where she was engaged breaking up an unusually heavy accumulation of frazil ice. When this work was completed and the channel clear, she returned to Montreal, arriving there April 24.

AVERAGE DEPTH for each month in the twenty-seven and a half-foot channel (27½ feet at ordinary low water) from Sorel Gauge during each year May to November

Year	May		June		July		Aug.		Sept.		Oct.		Nov.		Highest		Lowest	
	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
1892	31	0	31	9	31	6	30	6	28	9	28	3	28	3	33	6	27	3
1893	36	0	34	3	30	9	29	9	29	6	28	6	28	0	37	6	27	6
1894	34	6	31	9	31	0	29	2	28	3	28	9	29	0	36	0	27	7
1895	33	3	31	3	28	3	28	3	27	6	28	9	26	9	34	6	25	10
1896	33	6	30	6	28	9	25	0	27	6	27	9	29	0	37	0	27	4
1897	35	6	32	6	30	3	29	3	28	0	27	0	27	6	37	0	26	5
1898	31	6	30	9	29	8	28	2	28	2	28	3	28	6	32	1	26	9
1899	36	2	31	9	30	3	28	6	27	6	28	0	27	9	37	9	26	9
1900	33	6	30	9	30	6	29	6	28	1	28	9	29	2	35	9	27	4
1901	34	3	31	10	29	2	28	3	27	7	27	4	27	3	36	3	26	6
1902	32	2	32	2	32	2	29	4	28	1	28	1	29	0	34	1	27	6
1903	33	0	30	11	30	5	29	5	28	4	29	0	27	11	32	8	26	11
1904	36	3	34	5	30	9	29	5	29	5	30	4	29	3	37	4	28	1
1905	31	10	30	8	29	7	29	0	28	0	28	5	28	1	33	6	27	1
1906	32	4	31	5	29	3	27	11	27	3	27	4	27	6	33	3	26	9

AVERAGE DEPTH for each month in the thirty-foot channel (30 feet at extreme low water of 1897)

1907	37	1	35	9	34	3	32	10	32	4	32	9	33	7	38	3	31	10
1908	41	5	37	10	33	10	32	10	32	0	31	0	30	6	42	4	30	0
1909	40	6	37	6	33	10	33	2	32	7	32	4	31	6	42	7	30	11
1910	35	7	34	5	32	3	31	7	31	6	31	6	31	7	37	1	30	7
1911	36	6	34	6	32	1	31	3	30	9	30	2	30	3	38	1	29	4
1912	37	9	37	6	33	6	32	8	32	6	32	6	34	9	40	11	31	3
1913	37	0	34	4	32	8	31	10	31	6	32	1	32	7	38	6	31	1
1914	35	2	33	0	32	4	31	4	31	3	30	11	31	0	36	10	30	3
1915	34	7	32	6	31	6	31	4	31	1	30	11	30	8	37	4	30	1
1916	38	9	37	2	34	0	32	5	31	7	31	9	31	10	40	0	30	9
1917	36	8	36	6	34	10	33	6	32	3	32	6	33	0	38	2	31	3
1918	36	1	34	1	33	10	32	0	32	3	33	7	34	11	38	1	31	3
1919	39	7	36	7	33	5	32	4	32	3	32	8	33	5	41	1	31	3
1920	35	9	33	0	32	4	31	8	31	5	31	4	31	6	37	5	30	1
1921	35	6	32	9	31	10	31	4	30	10	31	4	31	6	37	8	30	1

COST OF SHIP CHANNEL TO DATE

TABLE showing the total cost of the dredging and plant and the quantities dredged to March 31, 1922

	Cost of Dredging	Expenditure for plant, shops, surveys, etc.	Quantities dredged
MONTREAL HARBOUR COMMISSIONERS, 1851 TO 1888	$ cts.	$ cts.	Cu. yds.
Dredging Montreal to Cap à la Roche to 27½ feet at O.L.W. and from Cap à la Roche to Quebec to 27½ feet at half tide.....	3,402,494 35	534,809 65	19,865,693
DEPARTMENT OF PUBLIC WORKS			
Dredging consisting of widening and cleaning up of channel, deepening Cap à la Roche to Cap Charles to 27½ ft. at O.L.W. and dredging at Grondines, Lotbinière and Ste. Croix 1889 to June 30, 1899.....	829,583 08	486,971 79	3,558,733
PROJECT OF 1899			
Dredging Channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet and straightening—			
Fiscal year 1899–1900.....	100,191 01	265,270 78	1,107,894
" 1900–01.....	136,680 83	287,040 04	2,479,385
" 1901–02.....	185,429 80	479,731 47	3,098,350
" 1902–03.....	255,776 55	277,703 50	6,544,605
" 1903–04.....	276,958 59	308,765 44	4,619,260
DEPARTMENT OF MARINE AND FISHERIES			
This includes the work below Quebec			
Fiscal year 1904–05.....	311,087 93	277,225 69	2,716,220
" 1905–06.....	431,768 30	317,327 37	4,047,530
" 1906–07 (July 1, 1906, to March 31, 1907).....	302,677 37	275,003 61	3,001,010
" 1907–08.....	478,209 66	417,390 22	4,831,875
" 1908–09.....	497,686 03	340,861 86	5,896,737
" 1909–10.....	572,950 71	321,375 80	6,354,285
" 1910–11.....	576,838 02	488,248 88	5,600,050
" 1911–12.....	588,697 60	499,799 58	4,509,904
" 1912–13.....	663,229 74	430,107 86	6,929,344
" 1913–14.....	895,235 59	426,018 12	6,140,867
" 1914–15.....	1,036,846 65	327,975 71	6,225,143
" 1915–16.....	976,622 03	771,760 03	8,462,957
" 1916–17.....	1,030,550 60	437,469 62	7,800,555
" 1917–18.....	618,399 69	136,765 97	2,517,376
" 1918–19.....	350,152 92	79,797 45	628,060
" 1919–20.....	422,107 05	132,747 20	517,305
" 1920–21.....	446,134 85	151,422 99	715,895
" 1921–22.....	464,660 74	102,710 14	1,167,100
	15,850,969 69	8,574,300 77	119,336,133

PROGRESS of dredging operations at date of writing, the close of the season 1921, thirty-foot project

Locality	Distance English Miles	Total length requiring dredging	Length dredged in 1921	Total length of 30-foot channel dredged	Length yet to be dredged
	Miles	Miles	Miles	Miles	Miles
Division No. 1— Montreal to Sorel	45	22·90	.....	22·90	All completed
Division No. 2— Sorel to Batiscan	36	12·45	.....	12·45	All completed
Division No. 3— Lake St. Peter	20	18·00	.....	* 0·50 †17·50	
Division No. 4— Batiscan to Quebec	59	10·00	·04	8·57	1·43
Division No. 5— Quebec to the Traverse	60	4·65	.....	4·65	
Totals	220	68·00	·04	66·57	1·43

*Not widened. †Widened

PROGRESS of the dredging operations at the date of writing, the close of the season of 1921, thirty-foot project

Locality	Length of Dredging		Cubic yards yet required to be done
	Required	Done	
	Miles	Miles	
Division No. 1—			
Longueuil Shoal		1·10	
Longue Pointe to Pointe aux Trembles (E.H.)		5·05	
Ile Ste. Therese		0·40	
Varennes to Cap St. Michel		3·00	
Cap St. Michel to Verchères		4·50	
Verchères Traverse		1·10	
Verchères to Contrecoeur		1·70	
Contrecoeur Channel		6·05	
Total		22·90	
Division No. 2—			
Sorel to Ile de Grace		4·40	
Stone Island		1·10	
Ile aux Raisins		0·25	
Lake St. Peter (See Div. 3)			
Port St. Francis		0·50	
Three Rivers		0·50	
Cap Madeleine to Bécancour		1·55	
Bécancour to Champlain		2·25	
Champlain to Pte. Citrouille		1·30	
Batture Perron		0·60	
Total		12·45	
Division No. 3—			
Lake St. Peter		* 0·50 †17 50	200,000
Total		18·00	200,000
Division No. 4—			
Batiscan to Cap Levrard		3·00	
Cap à la Roche Channel	0·28	1·77	214,405
Pouillier Rayer		1·20	
Cap Charles		0·90	
Grondines		0·80	
Lotbinière		0·40	
Cap Santé		0·20	
Ste. Croix	0·60	0·30	300,000
St. Augustin	0·60		500,000
Total	1·48	8·57	1,014,405
Division No. 5—			
Quebec to the Traverse		4·65	550,000
Total		4·65	550,000
Totals	1·48	66·57	1,764,405

*Not widened. †Widened.

SESSIONAL PAPER No. 28

PROGRESS of the dredging operations at date of writing, the close of the season of 1921, thirty-five foot project

Locality	Distance English Miles	Total length requiring dredging	Length dredged in 1921	Total Length of 35-foot channel dredged	Length yet to be dredged
		Miles	Miles	Miles	Miles
Division No. 1— Montreal to Sorel	45	27·24	0·84	17·30	9·94
Division No. 2— Sorel to Batiscan	36	19·75	0·04	6·22	13·53
Division No. 3— Lake St. Peter	20	18·32	.....	17·16	1·16
Division No. 4— Batiscan to Quebec	59	15·54	.....	.....	15·54
Division No. 5— Quebec to Goose Cape (North Channel)	66	8·14	.....	0·75	7·39
Total	226	88·99	0·88	41·43	47·56

PROGRESS of the dredging operations at date of writing, the close of the season of 1921, thirty-five foot project

Locality	Length of Dredging in Miles		Cubic yards yet to be dredged	Cubic yards dredged
	Yet to be done	Done		
Division 1—				
Longueuil Shoal	1·88	.....	517,959	203,495
Longue Pte. Traverse	0·39	0·08	443,592	51,550
Longue Pte. Curve	1·24	0·08	991,531	242,350
Pte. aux Trembles Channel	0·05	3·02	53,625	1,223,475
Ile Ste. Thérèse Channel	1·12	.....	146,611	.....
Varennes Curve	0·45	1·69	533,546	2,297,060
Cap St. Michel Curve	1·00	.....	500,500	.....
Cap St. Michel to Verchères	0·25	4·47	177,139	1,913,350
Verchères Traverse	0·25	0·47	92,763	193,625
Verchères to Contrecoeur	0·39	1·52	524·475	845,950
Contrecoeur Channel	2·31	5·97	2,038,532	3,574,343
Lanoraie to Sorel	0·61	.....	159,215	.....
Totals Division 1	9·94	17·30	6,239,488	10,545,198
Division 2—				
Sorel to Ile de Grace	0·88	4·10	871,206	2,838,854
Stone Island	1·42	0·69	466,370	414,890
Ile aux Raisins	0·99	1·10	202,125	777,224
Port St. Francis	0·67	0·33	491,303	248,275
Three Rivers	0·72	.....	533,192	.....
Cap Madeleine-Becancour	2·40	.....	1,348,578	.....
Bécancour to Champlain	1·16	.....	932,750	.....
Champlain to Pte. Citrouille	4·06	.....	2,632,356	.....
Batture Perron	1·23	.....	684,600	.....
Totals Division 2	13·53	6·22	8,162,480	4,279,243
Division 3—				
Lake St. Peter	1·16	17·16	1,161,570	11,335,582
Total Division 3	1·16	17·16	1,161,570	11,335,582
Division 4—				
Batiscan to Cap Levrard	4·48	.....	2,386,168	.....
Cap Levrard	1·27	.....	781,666	.....
Cap à la Roche Curve	2·06	.....	1,836,859	.....
Cap Charles Channel	2·04	.....	1,077,416	.....
Grondines	0·83	.....	513,332	.....
Lotbinière	0·47	.....	321,480	.....
Cap Santé	1·51	.....	655,561	.....
St. Croix	1·47	.....	798,518	.....
St. Augustin	1·41	.....	826,207	.....
Totals Division 4	15·54	.....	9,197,207	.....
Division 5—				
Quebec to Goose Cape (North Channel)	2·84	.....	2,585,132	.....
Madame Reef Shoal (West Sand and East Narrows Shoal)	4·55	0·75	454,813	13,113,228
Totals Division 5	7·39	0·75	3,039,945	13,113,228
Totals	47·56	31·43	27,800,690	39,273,251

Abstract of Work of Dredging Fleet during Fiscal Year ended March 31, 1922

Dredge	Locality of Dredging	Time of Service Days	Working Hours 10 per day	Hours Actual Dredging	No. of Scows Filled	Cubic Yards Dredged (Scow Meas.)	Depth of Dredged at L.W.	Width in Feet	Character of Soil	Remarks
Laval—No. 1	Forsyth shoal	47	470	353¾	61	15,250	35	400	Hard pan, clay, stones, boulders	Widening.
	Cap à la Roche	103	1,030	585¼	361	90,250	30	300	Shale, rock, boulders	Capt. J. Baron.
	Total	150	1,500	939	422	105,500				
Lady Minto—No. 4	Forsyth Shoal	35	350	245	35	8,750	35	400	Boulders, clay, stones, rock	Capt. J. Peloquin. Widening.
	Ste. Anne Curve	22	220	149	99	24,750	35	400	Clay	
	Champlain	92	920	581¼	317	79,250	30	225	Sand	Cleaning up.
	Total	149	1,490	975¼	451	112·750				
Lafontaine—No. 5	Cap à la Roche	109	1,090	629¼	320	80,000	30	130	Boulders, shale rock	Capt. L. St. Germain
	Forsyth Shoal	13	130	105	30	7,500	35	400	Hard pan, clay and stones.	Widening.
	Total	122	1,220	734¼	350	87,500				
Beaujeu—No. 8	North Channel	145	1,572	1,383	356	569,600	35	1,000	Sand, gravel, clay and stones.	Capt. Bourget.
	Total	145	1,572	1,383	356	569,600				
Dredge—No. 12	Verchères Contre-coeur Channel	123	1,230	904	1,167	291,750	35	225	Clay	Capt. Pierre Bibeau
	Total	123	1,230	904	1,167	291,750				

Total cubic yards dredged, 1,167,100.

CLASSIFICATION of Disbursements for Fiscal Year ended March 31, 1922.

Vessels	Fuel	Wages	Board	Stores and materials	Repairs and labour	Expenditure New plant	Proportion of general and office expenses, etc.	Expenditure for each vessel	Rock cutter and stone lifter service of dredges	Tug service	Inspection and sweeping service	Total cost of operations of each dredge and plant during fiscal year	Total expenditure on different appropriations
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Elevator Dredge No. 1	8,229 65	10,610 78	2,652 00	1,613 61	11,578 42		10,268 11	44,952 57	8,141 38		9,584 40	93,718 36	
Tug *Varennes*	5,998 90	6,876 17	2,759 40	983 55	7,331 32		7,090 67	31,040 01		31,040 01			
Elevator Dredge No. 4	7,280 85	9,490 33	2,737 80	2,793 68	8,400 18		10,694 68	41,397 52	8,141 38		9,584 40	78,928 71	
Tug *Emilia*	2,821 05	3,470 94	1,477 90	998 55			3,055 01	11,823 45		11,823 45			
Tug *Lavaltrie*	1,967 20	2,253 03	487 50	106 39	1,105 11		2,062 67	7,981 96		7,981 96			
Elevator Dredge No. 5	8,922 20	11,271 96	3,082 50	2,879 57	11,500 22		12,590 00	50,246 45	8,141 38		9,584 40	98,344 75	
Tug *Lac St. Pierre*	5,551 00	7,335 74	2,641 50	1,640 35	5,594 10		7,609 83	30,372 52		30,372 52			
Hydraulic Dredge No. 8	26,343 00	23,416 22	5,322 30	5,702 72	10,182 90		18,270 00	89,237 14			9,584 40	98,821 54	
Elevator Dredge No. 12	11,282 00	9,895 45	3,245 70	2,503 48	15,648 41		10,961 05	53,536 09	8,141 38		9,584 39	94,847 38	
Tug *James-Howden*	5,442 80	7,527 84	2,850 60	1,173 98	1,761 72		4,828 58	23,585 52		23,585 52			
Steamer *Detector*, divided equally between the dredges	14,083 88	13,301 22	5,294 70	2,409 16	3,022 13		9,810 90	47,921 99					
Rock Breaker No. 1, divided equally between the elevator dredges	3,357 25	6,509 54	1,965 60	1,621 46	5,736 26		4,940 34	24,130 95					
Stone Lifter No. 5	592 60	2,513 37	882 00	440 37	2,279 45		1,726 78	8,434 57					
	101,872 38	114,472 65	35,399 50	24,867 37	84,140 22		103,908 62	464,660 74	32,565 52	104,803 46	47,921 99	464,660 74	

Details of Dredging Locality and Cost per Cubic Yard.

Dredge	Total cost of operations of each dredge and plant during fiscal year	Number of days in operation each dredge	Cost per day operating dredges	Days working each locality	Cost of work each locality	Total Cost of operations of each dredge	Number of cubic yards dredged in each locality	Total cubic yard for each dredge	Cost per cubic yard each locality	Average cost per cubic yard for each dredge	Kind of material dredged	Locality of dredging
	$ cts.		$ cts.		$ cts.		$ cts.					
Elevator Dredge No. 1..	93,718 36	150	624 79	47	29,365 09	.....	15,250	.....	1·92$^{56}/_{100}$	.....	Clay, stones, hard pan, boulders, shale, rock and boulders.	Forsyth Shoal.
				103	64,353 27	.....	99,250	.....	·71$^{31}/_{100}$	.....		Cap à la Roche.
						93,718 36	.....	105,500	.....	·88$^{38}/_{100}$		
Elevator Dredge No. 4..	78,928 71	149	529 72	35	18,540 30	.....	8,750	.....	2·11$^{89}/_{100}$	.....	Clay, stones, hard pan, boulders, sand (cleaning up).	Forsyth Shoal.
				92	48,734 51	.....	79,250	.....	·61$^{49}/_{100}$	.....		Champlain.
				22	11,653 90	.....	24,750	.....	·47$^{9}/_{100}$	.....	Soft clay	Ste-Anne Curve.
						78,928 71	.....	112,750	.....	·70		
Elevator Dredge No. 5..	98,344 75	122	806 10	109	87,865 39	.....	80,000	.....	1·09$^{83}/_{100}$	.....	Shale, rock, boulders	Cap à la Roche.
				13	10,479 36	.....	7,500	.....	1·39$^{72}/_{100}$	.....	Clay, stones and boulders.	Forsyth Shoal.
						98,344 75	.....	87,500	.....	1·12$^{39}/_{100}$		
Hydraulic Dredge No. 8	98,821 54	145	681 53	145	98,821 54	.....	569,600	.....	·17$^{35}/_{100}$	.....	Sand, gravel, clay and stones.	North Channel East Narrows.
						98,821 54	.....	569,600	.....	·17$^{35}/_{100}$		
Elevator Dredge No. 12	94,847 38	123	771 12	123	94,847 38	.....	291,750	.....	·32$^{51}/_{100}$	.....	Clay	Vèrcheres, Contrecoeur Channel.
						94,847 38	.....	291,750	.....	·32$^{51}/_{100}$		
	464,660 74	689	.....	689	464,660 74	464,660 74	1,167,100	1,167,100				

SOREL SHIPYARD

Report of Superintendent, Louis Lacouture

The river Richelieu was clear of ice on March 18, and the St. Lawrence on March 27.

The dredges and their auxiliary vessels were put in commission on ship channel work on the following dates:—Dredge *No. 1,* May 2; Dredge *No. 4,* May 2; Dredge *No. 5,* June 8; Dredge *No. 8,* May 5; Dredge *No. 12,* June 17.

During the season all vessels were kept in good order.

NEW CONSTRUCTION

No new vessels were built at the shipyard during the fiscal year, 1921-22.

DOMINION STEAMERS

Repairs were made to the Dominion steamers *Aranmore, Bellechasse, Lady Grey, Frontenac, Montcalm, Argenteuil, Dollard, Shamrock, Reserve,* and *Verchères.*

CONSTRUCTION OF LIGHTS

Had use of pile driver and scows, also repairs and supplies for lights.

BUOY SERVICE

Was supplied with fittings and material, such as rods, shackles, chains, hooks, etc. Repairs also made to buoys.

SIGNAL SERVICE

Repairs were made to signal stations and supplies turned out for same.

ST. LAWRENCE SHIP CHANNEL

Work for this branch consisted of making and repairing gauge boards, supplying timber, etc., and repairs to yacht *Yinkin.*

PRIVATE FIRMS

Sincennes McNaughton Line had use of sheer legs, and welding done to boilers of tugs.

The Transportation and Shipping Company had use of sheer legs and plates rolled and drilled for their use.

A. Beaudet, Sorel.—Completion of work on steamer *François C.*

Sorel Mechanical Shop, Limited, had use of sheer legs.

GENERAL

All buildings, wharves, hauling ways and fences were maintained in good condition, and all necessary repairs made.

The shipyard launches *Bronx* and *Sorel* were kept in good condition and painted.

The force employed during the fiscal year varied from 363 men in May to 143 in October, 1921, and averaged 253 men employed daily.

STATEMENT of Expenditure and Revenue, Marine Department, 1921-22

Service	Appropriation	Expenditure	Balance
	$ cts.	$ cts.	$ cts.
Ocean and River Service.—			
Dominion steamers	1,750,000 00	1,510,158 69	239,841 31
Examination of masters and mates	20,000 00	19,958 29	41 71
Rewards for Saving life	90,000 00	66,325 45	23,674 55
Investigation into wrecks	12,300 00	5,799 25	6,500 75
Schools of navigation	8,000 00	6,978 40	1,021 60
Registration of shipping	6,000 00	2,790 59	3,209 41
Removal of obstructions	18,000 00	15,252 77	2,747 23
Allowance to Mrs J. T. Roach	1,000 00	1,000 00	.....
Cattle inspection	3,000 00	2,946 53	53 47
Subsidy to wrecking plants	35,000 00	35,000 00	.....
Unforeseen expenses	5,000 00	2,188 17	2,811 83
Distressed seamen	16,000 00	15,991 13	8 87
Total	1,964,300 00	1,684,389 27	279,910 73
Public Works (Capital)—			
Sorel Shipyard	75,000 00	47,248 11	27,751 89
Ship Channel	613,000 00	567,370 88	45,629 12
Shipbuilding	8,330,000 00	5,592,703 34	2,737,296 66
New ice breaker	2,000,000 00	457,656 81	1,542,343 19
Total	11,018,000 00	6,664,979 14	4,353,020 86
Lighthouse and Coast Service—			
Agencies, rents and Contingencies	216,500 00	190,953 24	25,546 76
Salaries of light-keepers	650,000 00	649,298 56	701 44
Maintenance of lights	800,000 00	794,954 12	5,045 88
Construction of lights	400,000 00	399,981 54	18 46
Signal service	75,000 00	74,848 07	151 93
Administration of pilotage	250,000 00	92,128 46	157,871 54
Maintenance and repairs to wharves	10,000 00	6,772 84	3,227 16
Ice-breaking	56,000 00	56,000 00	.....
Pensions to retired pilots	9,000 00	8,850 00	150 00
Telephones aid to navigation	500 00	.....	500 00
Allowance harbour master at Amherstburg	600 00	600 00	.....
Motor patrol in British Columbia	15,000 00	5,879 29	9,120 71
Allowance J. Davidson	500 00	500 00	.....
Total	2,483,100 00	2,280,766 12	202,333 88
Scientific Institutions—			
Meteorological	252,000 00	251,896 35	103 65
Total	252,000 00	251,896 35	103 65
Steamboat Inspection—			
Steamboat inspection	108,810 00	103,669 51	5,140 49
Total	108,810 00	103,669 51	5,140 49
Civil Government—			
Salaries	269,900 00	268,380 01	1,519 99
Contingencies	48,870 00	48,712 80	157 20
Total	318,770 00	317,092 81	1,677 19
Miscellaneous—			
Bonus		270,220 60	
Gratuities		2,507 05	
Classification		35,783 48	
Superannuation No. 4		11,050 26	
Exchequer Court Awards		83,142 71	
Governor General Warrants		70,837 90	
Montreal Harbour Commission		2,303,000 00	
Quebec " "		14,600 00	
Vancouver " "		1,581,000 00	
Imperial Government		13,008 03	
Victoria, B.C., Shipowners		39,476 24	
Demobilization		4,609,321 01	
Consolidated revenue		83,142 71	
Total		9,117,089 99	

RECAPITULATION of Services

Ocean and River Service	1,964,300 00	1,684,389 27	279,910 73
Public Works (Capital)	11,018,000 00	6,664,979 14	4,353,020 86
Lighthouse and Coast	2,483,100 00	2,280,766 12	202,33 88
Scientific Institutions	252,000 00	251,896 35	103 65
Steamboat Inspection	108,810 00	103,669 51	5,140 49
Civil Government	318,770 00	317,092 81	1,677 19
Total	16,144,980 00	11,302,793 20	4,842,186 80
Other Expenditures		9,117,089 99	

STATEMENT of Revenue for Fiscal Year 1921-22

	Gross	Refunds	Net
	$ cts.	$ cts.	$ cts.
Harbours	901 82	.....	901 82
Piers and wharves	79,438 14	848 38	78,589 76
Dominion steamers	268 75	.....	268 75
Masters and mates	3,275 00	6 00	3,269 00
Steamboat inspection	119,691 78	1,873 25	117,818 53
Decayed pilots' fund	8,417 51	.....	8,417 51
Casual revenue	374,677 12	949 69	373,727 43
Fines and forfeitures	4,000 86	880 91	3,119 95
Signal station service	645 00	.....	645 00
Marine registry searches	102 23	.....	102 23
Halifax pilotage	60,485 75	.....	60,485 75
Halifax superannuation	4,112 60	.....	4,112 60
St. John pilotage	43,197 12	.....	43,197 12
St. John superannuation	6,841 40	.....	6,841 40
Total	706,055 08	4,558 23	701,496 85

METEOROLOGICAL SERVICE

REPORT OF SIR FREDERICK STUPART, DIRECTOR

As time goes on, it becomes more and more obvious that climatic records are essential to the development of the country. Agriculture and power developments are industries particularly dependent on temperature and rainfall and the Meteorological Service is being continually pressed to increase the number of observing stations. At the present time there are 646 observing stations, an increase of 12 over last year's. At 293 of these stations the observer is paid a salary for the duties performed, but it is only at Toronto, Victoria, Edmonton, Moose Jaw, Winnipeg, Quebec and St. John, that the observers are paid for whole time work. In the majority of instances the stipend is very small. At 353 stations the observing is performed voluntarily by men who take an interest in Meterological records.

THE CENTRAL OFFICE

The Central Office staff consists of thirty-eight persons and for purposes of administration is divided into eight divisions, the activities of which have been as follows:—

Forecasts.—Synoptical charts of the North American continent, Western Europe. and the North Atlantic ocean, have been compiled twice daily from reports received by telegraph, cable and wireless, and from study of the atmospheric movements

shown by these charts, forecasts of the probable weather for the next thirty-six hours in Canada and Newfoundland and adjacent waters have been issued, and when deemed necessary storm warnings have been issued to ports on the Great Lakes, and gulf of St. Lawrence, and on the Atlantic and Pacific coasts. This division also purchases, supplies, supervises the issue of meteorological instruments and signal lights and drums in all parts of Canada.

The percentage and verification of the daily forecasts has been 84·3, and of storm warnings 83·4.

Climatology.—Prepares monthly and annual bulletins and detailed reports with maps, diagrams, etc., on current weather in all parts of Canada, Newfoundland and Bermuda, supplies weather data to railways and litigants to decide disputes and claims founded on damage through effects of weather. Upon request furnishes special studies of extremes and averages of temperature, precipitation, wind movement, etc., in specified districts to water-power and construction engineers, settlers, physicians and others.

Prepares and issues comprehensive reports and atlases on the climate of the various provinces embodying results of weather observations during the period since Confederation, prepares shorter articles on related subjects for inclusion in bulletins of other governmental departments and of provincial governments, boards of trade, etc.

During the year 1921, the printing of the Record was transferred from Toronto to the Printing Bureau at Ottawa.

Commencing with the issue for January, 1922, certain daily observations, formerly published but omitted during war-time when the issue of the Record was reduced, are being printed and with the same number commences a more comprehensive summary of wind observations.

Work has been continued on the detailed report on the climate of Eastern Canada. The part dealing with the temperature and precipitation of Ontario, illustrated with maps and diagrams will be published during 1922.

Study of Canadian crops in relation to weather changes has also been continued. A method of studying graphically the yields of wheat in the Canadian West in relation to the seasonal changes in the prevailing winds of the North Temperate Zone, was devised during the year and explained before the Toronto meeting of the American Meteorological Association. The maps made in this connection showed the futility of attempts at artificial rainmaking and also showed that for the south-western districts of the wheat region frequently recurring dry years are normal and that therefore, irrigation canals should always be kept in good repair from season to season, even in years of ample rainfall.

Having regard to the growing interest in Canada with respect to problems of reforestation, this division has installed a study of variations in the growth of pine and spruce in order to trace the effect of the weather changes and of local climates. At the present time sections of aged felled trees or even of stumps, are easily obtained from the date of the last annual ring identified with certainty. A collection of such sections from different parts of Canada is being made and correlations of annual ring-growth with weather computed. It is proposed to increase the collection by having paper impressions made wherever possible by Meteorological inspections in future when on annual inspections of outlying stations.

Mr. F. F. Payne, of the Central Office, has for some years past prepared interesting tables of phenological observations made on the various provinces and these may be found in the Annual Report of the Royal Society of Canada; a small supply of reprints is furnished to this service. While it has not been considered necessary to publish these observations in detail in the Meteorological Record they will within a few years form the basis of a most valuable summary report showing the variations

in the growing season in the several provinces. Such summaries would not only be valuable from an educational point of view, but would also be useful to the agriculturist and climatologist. Some diseases are found to be more prevalent at the time of flowering of plants so that such dates would also be valuable to the medical profession.

Atmospheric Physics.—Pilot balloon work was carried on at Toronto and Camp Borden, Ont., throughout the year and at Ottawa, Ont., Roberval, P.Q., and High River, Alta., during the flying season. New stations were opened at Halifax, N.S., and Victoria Beach, Man., at the aerodromes of the Air Board, and at Victoria, B.C., in connection with the Meteorological Service. A book of tables for readily obtaining the horizontal distance of the balloon from the station at any minute, was prepared and published. This book in conjunction with the special plotting board enables the observer to very quickly obtain the direction and velocity of the wind at various heights. Balloons have been despatched regularly at these stations whenever the weather permitted. The highest flight obtained at Toronto was on 31st July, 1921, when the balloon was followed for ninety-nine minutes and reached a height of 52,000 feet. The highest flight obtained in Canada up to the present occurred on January 26, 1922, at Camp Borden, when the balloon was followed for 106 minutes and reached a height of nearly 56,000 feet.

Balloons carrying instruments were sent up from Woodstock, Ont., on the International days and the recoveries were very good until January, 1922, when six balloons were sent up and only two found. To obtain upper air data in the west arrangements were made in October for sending up balloons with instruments from Calgary, Alta., and of those sent up about half have been found. The international committee has altered the procedure in sending up the balloons. Hitherto there were six consecutive flights in one month of the year, three consecutive flights in three months and one flight in each of the remaining months. According to the new procedure there are to be but three definite periods of six flights each in the year and for one of the periods the ascents are to take place every twelve hours.

The Meteorological Service had under taken as their part of the international programme in connection with Amunsden's Expedition to send an observer to Fort Good Hope, Mackenzie River District, to take pilot balloon, meteorological and magnetic observations during the year July, 1921-July, 1922. Although Capt. Amunsden has had to postpone his part of the programme the Meteorological Service carried out its part and sent Mr. Harold Bibby to Fort Good Hope. He reached his destination on July 11, and will return in July of this year. The reports received by the winter mail indicate that the instruments were all working satisfactorily.

Two types of thermometers for use on board ship to take the temperature of ocean water in the Pacific were tried out during the year. One was a thermograph of the Bristol type. It consisted of a steel bulb filled with mercury inserted in the intake pipe to the condenser and connected by fine steel capillary tubing to the registering part. The other was a resistance thermometer inserted in the intake and connected to a Wheatstone bridge which was adjusted by a special rheostat so that the temperature read directly on a scale to a fifth of a degree. Readings were taken every four hours. While the tubes exposed to the action of the sea water were made of steel or iron and were practically the same as the pipes in which they were inserted yet the corrosion was so great that it very soon destroyed the thermometers. This defect is now being remedied as well as some other minor defects that developed in the resistance thermometer.

Earth temperature thermometers were almost ready for installation last fall but the freezing of the ground prevented them from being put in. It is proposed to put in a set of thermometers at depths of 4 inches, 10 inches, 20 inches, and 40 inches to be recorded for a period of eight minutes once in every sixty-four minutes and a surface thermometer to be recorded three times in this interval. Thermometers at depths 5 feet 6 inches, 9 feet and 15 feet, to be read once daily will also be added.

Through the courtesy and assistance of Mr. Parkins, of the University of Toronto, extensive observations were made in the Wind Tunnel of the university on the anemometer, and much valuable information on the action of the wind on the anemometer has been obtained. The Meteorological Service desires to take this opportunity of expressing to Mr. Parkins and his assistants its grateful appreciation of the services they rendered and of making it possible to carry on the investigation.

Magnetics.—Photographic records of the variations taking place in the magnetic elements during the fiscal year 1921-22 were obtained at Agincourt with only very slight loss. Pronounced disturbances were of very infrequent occurrence, as was expected in a year of minimum sunspots.

On May 12, however, a very remarkable series of disturbances began which lasted until the 21st, and were repeated at each rotation of the sun for several months, although with much diminished energy. During the May disturbance the limits of our recording instruments were exceeded and for several hours the record was lost. In declination the range was greater than 4° and in horizontal force nearly 1,200, which is almost 8 per cent of the normal value.

Absolute observations for D, H and I were made each week and base values for the differential instruments determined from them.

Tables showing the magnetic character of each day of the year were prepared and copies forwarded to the International Commission on Terrestrial Magnetism. The "selected days" of the commission are used in the analysis of the magnetic data for our annual magnetic report

At the request of the Surveyor-General, index corrections for compasses attached to surveyors' theodolites to the number of sixty were determined and the results forwarded to him. Assistance was also given to members of his staff in determining the constants of their total force instruments both before and after their field work.

Members of the staff of the Dominion Observatory were also assisted in standardizing their magnetometers and dip circles.

Many special reports were made for inquirers and surveyors who required data for specified places and times.

A report was also made of the work of the Canadian magnetic observatories and of the intercomparison of magnetic instruments in Canada for presentation at the Rome meeting of the International Geodetic and Geophysical Union.

The observatory at Meanook was continued in operation as before. During the very cold weather some loss of record occurred owing to stopping of the driving clock.

Weekly observations were made of absolute declination and inclination and twice a month observations of horizontal force.

The declination photographic traces for both Agincourt and Meanook were loaned to the Surveyor-General and the Agincourt declination traces to the Dominion Observatory for use in the reduction of their field work.

SUMMARY of Results of Magnetic Observations made at Agincourt during the Fiscal Year 1921-22

Month	Mean Monthly Values			
	D West	H	Z	I
1921	° ′	γ	γ	° ′
April	6 49·4	15851	58087	74 44·2
May	50·2	31	83	45·2
June	49·7	46	73	44·2
July	50·1	43	64	44·3
August	51·0	37	47	44·4
September	51·8	26	46	45·0
October	52·5	22	31	44·9
November	53·2	25	22	44·7
December	53·6	25	20	44·6
1922				
January	53·8	21	17	44·8
February	54·6	17	00	44·8
March	55·2	10	00	45·1

AGINCOURT DAILY AND MONTHLY RANGES

Month	D			H			Z		
	Mean Daily Range		Absolute Monthly Range	Mean Daily Range		Absolute Monthly Range	Mean Daily Range		Absolute Monthly Range
	From hourly readings	From Max. and Min.		From hourly readings	From Max. and Min.		From hourly readings	From Max. and Min.	
1921	′	′	° ′	γ	γ	γ	γ	γ	γ
April	10·4	21·6	1 04·9	36	82	476	17	36	268
May	12·6	48·2	4 20·0	103	213	1,166	57	168	1,148
June	12·3	18·6	0 57·4	33	64	171	10	25	123
July	15·0	21·2	0 44·9	39	67	137	12	29	109
August	14·6	20·1	0 38·1	44	72	171	14	33	149
September	12·4	21·6	1 48·5	41	78	557	12	41	438
October	9·5	20·1	1 55·0	34	74	506	24	48	706
November	7·5	15·4	1 24·0	22	53	190	13	27	150
December	6·3	18·3	0 59·4	20	58	172	8	23	112
1922									
January	5·5	17·3	0 51·5	27	54	150	8	27	185
February	6·6	19·0	0 57·2	16	62	261	11	29	159
March	9·3	21·2	0 51·3	31	93	469	24	51	272

SUMMARY of Results of Magnetic Observations made at Meanook during the Fiscal Year 1921-22

Month	Mean Monthly Values			
	D East	H	Z	I
1921	° ′	γ	γ	° ′
April	27 34·9	12,901	60,169	77 53·9
May	33·5	896	172	54·2
June	33·5	908	202	53·9
July	31·9	910	186	53·6
August	31·6	902	123	53·3
September	31·3	903	213	54·3
October	30·7	896	189	54·4
November	31·4	910	245	54·3
December	30·8	908	142	53·2
1922				
January	31·8	908	176	53·6
February	32·4	920	189	53·1
March	30·1	890	115	53·7

MEANOOK DAILY AND MONTHLY RANGES OF D

Month	From hourly readings	From Max. and Min.	Absolute Monthly Range
1921	′	′	° ′
April	13·7	48·3	3 56·9
May	17·7	73·6	6 16·2
June	16·2	26·4	1 07·1
July	15·0	28·6	1 31·3
August	14·9	33·5	2 57·0
September	13·0	39·0	3 43·0
October	9·4	39·2	3 57·2
November	7·5	27·9	2 12·9
December	5·9	31·7	2 12·0
1922			
Jauary	5·3	31·1	2 26·6
February	7·1	49·8	4 21·3
March	11·8	50·5	3 59·1

Time Service.—During the year ending March 31, 1922, seventy-seven observations for time were made, of which seventy-four were meridian transists of stars and three of the sun.

The determination for instrumental errors in collimation being made principally by reversal on Polaris and also by reversal on suitable star sets in connection with the determination of the azimuth error, the computations being made by the method of least squares.

The level error is obtained by direct measurement with a delicate striding level by Troughton and Simms, the value of a division of the scale being 1·4 inch.

The positions of the stars used being those tabulated in the American Ephemeris.

The various clocks and chronometers in use continue to give satisfaction. The magneto clock has been in operation and continues to perform its work well.

Owing to the many uses, electrical connections, and contacts to which our present clocks are subjected to, it would be advisable to install a free running mean time seconds clock to assist in the better preservation of the time obtained by observation.

Inquiries for time both mean and sidereal and the rating of watches have been increasingly numerous.

The usual daily signal at 11.55 a.m. has been given to the city over the fire-alarm system.

The time has also been given to Agincourt Magnetic Observatory weekly and daily to the Canadian Northern Division of the Canadian National Railway System running out of Toronto.

Visitors and others have been accorded many opportunities of viewing the heavenly bodies with the 6-inch equatorial telescope when available.

The usual time exchanges between Toronto and Quebec, Montreal and St. John, N.B., have been made and recorded on the chronographs at Toronto, Montreal and St. John, the errors of the clocks being computed from the latest observations.

Solar Observations.—During the civil year ending December, 1921, the sun was observed on 173 days with the 6-inch equatorial telescope and the usual maps drawn showing the position and size of the various groups of sunspots. On nineteen of these days the sun's disc was completely free of spots.

The following table will show the differences between the times at the several observatories, and that at Toronto:—

(The Sign + indicates slow of Toronto)

Date	Quebec	Montreal	St. John, N.B.
1921	Seconds	Seconds	Seconds
April 15	−0·55	−0·31	−0·5$_1$
May 13	+0·77	+0·03	−0·6$_9$
" 27	+0·60	−0·21	−0·0$_e$
June 17	+0·77	+0·10	line troubl
July 15	+0·34	−0·98	"
" 29	−0·76	−1·68	−1·43
August 26	−0·84	−0·30	+0·10
September 16	+0·13	Bad wire	not on
October 21	−1·39	−0·29	0·04
November 11	+0·13	−0·04	+0·54
" 25	+0·07	−0·87	−0·96
December 23	−0·67	−0·24	+0·09
1922			
January 13	−0·20	−0·38	−1·08
" 27	−0·37	−0·28	−0·80
February 10	−1·39	−0·74	−1·12
March 10	−0·23	−0·43	−1·00
" 24	−0·46	−0·57	−0·77

Seismology.—The Milne seismographs at Toronto and Victoria have been kept in operation throughout the year with little loss of record. No alterations were made in their adjustments, the booms being steady at a period of 18 seconds.

Toronto recorded ninety-three disturbances, forty-five less than last year, and thirty-seven less than the average number for the past seven years.

The month of May with thirteen, and August and December with three, show the greatest and the least number recorded in any month of the year.

The largest quakes occurred on January 17 and 31, giving trace amplitudes of 13 and 16 mm. The epicentre of the former was possibly off the coast of Centre Columbia and may have been a dual earthquake, and that of the latter, off the coast of Northern California.

Quakes of lesser intensity with amplitudes ranging from 2 to 3·2 mm. were recorded on:—

April 10—Epicentre, north of Queen Charlotte Island.
May 1—Epicentre off Tejupan Point, Mexico.
August 23—Distance from Toronto, 3,610 km.
September 11—Distant.
October 15—
December 18—Distance, 5,000 km.
January 9—Distance, 3,330 km.

We continue to forward abstracts of both the Toronto and Victoria observations to various seismological centres throughout the world. The records are also published, and information regarding the character of any large disturbance, together with its distance from Toronto is furnished to the Press Associations. The Toronto evening papers are supplied with bromide copies for publication.

At the request of Professor Turner, Chairman of the Seismological section of the British Association, we are remeasuring from 1913 all our tabulations, in an effort to detect possible mistakes or wrong analysis of the various waves with a view of arriving at a more accurate table of velocities.

The new Milne-Shaw instruments referred to in previous reports have not yet arrived owing to the press of orders at the manufacturers.

The Library and Publications.—Volumes, including annual meteorological reports, received from various countries have been 162 in number, while daily, weekly and monthly reports have come from 104 different services. Each month 531 copies of the Canadian Weather Record and 626 copies of the Monthly Weather Map have been sent out, and each day 374 weather maps have been distributed from the Central Office and about 200 from the Winnipeg branch. Nearly 200 copies of the Toronto Observatory Year Book were sent out and also 87 copies of the Magnetic Observatory report for both the years 1917 and 1918.

Mechanics.—The station equipment for all meteorological stations is first assembled in the Central Office workshop. The thermometer screens are wholly constructed here—barometers are tested and packed, as are also thermometers. Wind-gauges, sunshine recorders, rain-gauges and various other instruments are carefully inspected before being shipped. Much mechanical apparatus required by the physics branch is here constructed and instruments are being constantly sent in for repairs.

Appendix A

The Director of the Quebec Observatory reports as follows:—

The work performed at this observatory has been the same as in former years.

Meteorological observations were taken daily without interruption, and the instruments were kept in good order.

Monthly reports were forwarded to the Central Office, and extracts from the records of the observatory were furnished to the public through the newspapers and otherwise. Statements as to the weather conditions, exact hour of sunset at different places and angle of elevation of the sun at certain time of the day, etc., were supplied for use in several cases before the courts.

The weather bulletin has been posted regularly in the principal sections of the city and published in all the newspapers, and an ever increasing number of inquiries were also answered by telephone concerning the local weather forcasts.

Several chronometers were rated and barometers were compared with standard instrument in this office.

The clock errors and rates have been determined by observations of standard stars on nearly ever fine night and the correct time was given by means of the time ball, the noon-gun and also by telephone.

Whenever observations could not be taken, the error of the mean time clock was obtained by comparisons with the sidereal clock which has a steadier rate.

The mean time clock being situated in the residence, is much more affected by sudden changes in the temperature and by vibrations during strong winds and gales.

Allow me to state the following facts with regard to the condition of the observatory buildings.

In the course of November, 1913, the engineer of the Public Works Department, while making his annual survey of the Government properties at Quebec, made a personal inspection of the premises. This gentleman reported that the buildings were in a bad state of repair and that they were not susceptible of any profitable alterations or improvements without a considerable expenditure of money, and he advised the Department to erect a new building.

During the month of February, 1914, I was requested to report as to the proposed improvements and necessary repairs to the buildings so as to make them in keeping with the National Battlefields Park in which they are situated.

After conferring with the authorities of the National Battlefields Park Commission, and taking the advice of the resident engineer of the Department of Public Works, I deemed it my duty to report that a new building was needed.

In the year 1919, the Department of Public Works had intended to make some urgent repairs, and to that end, one of the inspectors of that department came to Quebec, and after making a thorough inspection of the buildings, he found that they were in such a bad state that they were unfit to be repaired.

By letter dated July 23, 1918, I was requested by the Secretary of the National Battlefields Park Commission to take steps to remedy the unsanitary conditions arising from the fact that the overflow of the observatory wooden cesspool emptied at intervals in the park roads, owing to the sloping state of the grounds.

This matter was brought to the attention of the officials of the Department of Pubic Works who made the suggestion that a pipe connection be made with the park sewer system.

I then made a survey and plan showing the location of the proposed pipe connection, but this matter has remained in abeyance pending the construction of a new building.

As above stated, the observatory is situated within the National Battlefields Park, and occupies a space of 300 feet by 200 feet.

The grounds have never been fenced in, and it would be necessary for the protection of the various instruments lying in the open, to erect a suitable fence, in order to prevent their being tampered with by the public visiting the Park.

Should the department decide to build a new observatory, I would ask you to kindly allow me to offer a few suggestions which I believe are useful and necessary, as to the inside partitions, the location of the instruments, etc., so as to remedy many inconveniences and defects which have come to my notice during the 28 years that I have been in charge of the observatory.

Appendix "B"

The Director of the St. John, N.B., observatory reports as follows:—

The regular routine of meteorological observations has been carried on continuously throughout the year. Eye readings, made tri-daily, of the various instruments serve as a check to standardize the electric and autographic recording

instruments. Hourly abstracts, from the recording instruments, have been made and monthly sums and means computed. As in the past the morning and night observations have been telegraphed the central office at Toronto for purposes of the weather charts.

No changes of importance have been made in the equipment or in the exposure of the outside instruments.

The wind station at Point Lepreau continues to give valuable records of direction and velocity in that section of the bay of Fundy; the anemograph records sent here from that station have been tabulated and the monthly analysis abstracted. The anemometers at Point Lepreau and St. John are frequently changed, cleaned and lubricated.

Returns from all observers in the Maritime Provinces are received here monthly, have been checked, sums and means abstracted, and records of climatic conditions of the various stations kept for reference. This data is available to promptly answer numerous inquiries we have for weather conditions, locally as well as covering the Maritime Provinces.

During the past year, requests for information have been largely in excess of previous years and a large amount of clerical work resulted from these inquiries.

The weather bulletin received each week-day morning from Toronto has been issued with the least possible delay, is posted in public places, distributed through the mails and published by the evening newspapers. The synopsis, giving movement of important changes throughout the continent and prevailing weather and atmospheric conditions at the different stations adjacent to our coasts, and the forecasts for following days are of the highest importance to mariners, shippers of perishable goods and various other commercial and personal interests. Numerous telephone calls are daily received for the forecasts and other information pertaining to the weather.

In addition to our daily local report the press is frequently furnished with information, especially during the stormy season or when periods of extreme or unusual conditions prevail.

Ever increasing telephone calls for the time, prevailing weather conditions, forecasts and other numerous questions have been answered daily and frequently at night.

MARITIME PROVINCE TIME SERVICE.

Observations of stars on available nights have been made with the three-inch Troughton & Simms meridian telescope. The transit micrometer method of observing as particularized in former reports has been continued.

The Riefler sidereal clock run under constant pressure and temperature in the basement clock room continues to give its usual excellent results. This clock after a run of seven years was dismantled and cleaned in August. After a short period of testing the case was sealed and air pressure reduced to its former level. During the period of its cleaning and testing the Kullberg sidereal was used as the primary standard.

The mean time transmitting clock which is ru non Atlantic Standard Time, continues to give most satisfactory service. Its electrical contacts for automatically transmitting the time signals and the hourly contact for synchronizing purposes have operated without failure. The daily time signals, which reach the most important points in the Maritime Provinces have been regularly and automatically transmitted from this clock through connection with the telegraph wires on our switchboard.

The master clock in Halifax, daily synchronized by wire direct from our mean time clock has been giving satisfactory results. This clock is automatically synchronized by our 10 a.m. time signal, daily, should failure occur, owing to wire trouble, it

receives the signal of correction at the first following hour service has been resumed. Its service of automatically dropping the time-ball on the Citadel and for synchronizing connected clock in Halifax has been highly satisfactory.

In addition to their synchronized and electric wound clocks in St. John and Halifax the Western Union Telegraph Company now have similar clocks in Moncton, Woodstock, Truro, Sydney and Charlottetown. They are electrically corrected to the second by signals from our transmitting clock which are on the repeaters in the Western Union Offices here every hour day and night. Consequently these outside clocks may receive the signals at any hour of the twenty-four which may be convenient. It is the purpose to further increase the number of these electric clocks at different points. They serve as a standard of time for the public wherever placed.

The system for several years, in operation in St. John, for locally synchronizing office, factory, street and tower clocks every hour day and night by wire from our master clock has been working perfectly and is a most useful service.

The time-balls at St. John and Halifax, under the control of the observatory time service, have as heretofore been dropped each week day at 1 p.m. Atlantic Standard Time. A few places in the Maritime Provinces, again last year adopted Daylight Time, which as in the previous year was the cause of considerable confusion.

Appendix "C"

The Director of the Gonzales Heights observatory, Victoria, B.C., reports as follows:—

During the past year the regular meteorological observations have been taken and daily weather forecasts issued for the following districts: Victoria and Nanaimo, the Lower Mainland, Kamloops and Kootenay. In the spring and early summer, special temperature forecasts were sent to the fruit-growing centres in the Okanagan District, and again in the autumn and early winter information was sent out respecting the advent of the first severe frosts and later of sufficient cold weather which might damage the shipping of fruit across the mountains to the Prairie Provinces.

Storms warnings have been issued for the ports of Victoria, Nanaimo, and Vancouver, and owners of small craft and towing companies are in ever increasing numbers making use of the above and phoning this office for greater detail of storms or high winds.

During the summer months the Provincial Department of Forestry was furnished with daily weather forecasts for the various forest districts, aud during the hottest periods a four- to six-day forecast was furnished, which through the above Central Forestry office was wired to the district forest rangers.

This information has proved of practical benefit in the matter of forest fire fighting by enabling the rangers to increase their staff in advance of serious outbreaks or to diminish these during cool showery periods.

The time service has been very satisactory throughout the year. The time-ball has been dropped daily at 1 p.m. by wire from this office to its site on one of the highest buildings on the city water front. The time gun which through the courtesy of General Ross was installed last year has been fired regularly at noon and at 9 p.m. from this office by a phone signal to the officer on duty. The night gun is particularly well heard and is appreciated by many both in the city and its suburbs. The time is also sent out by wireless each morning to a radius of from 300 to 400 miles from this office, for the benefit of shipping and the other Government wireless stations.

A large number of visitors (1,500) have passed through this institution during the past year, and have been greatly interested in our instruments and the valuable work being carried on here.

During the past year only 101 earthquakes were recorded on the seismographs here, while in the previous year the total was 131. Several severe earthquakes were recorded, the most important occurred off the northern coast of California on January 31, 1922.

I am pleased to state that the pilot balloon ascents now made from here on all suitable days since you kindly arranged this service last September are proving of practical value in connection with weather forecasting here, and the data obtained from these flights are throwing considerable light on the upper air movements during various types of barometric pressure prevailing on the North Pacific slope.

Fifty-five balloon flights have been observed during the past seven months; the average duration of these was 31 minutes. During four flights the balloons were kept in the field of the observing theodolite for over 60 minutes each, while on December 15, 1921, the longest flight was obtained, giving a distance of 23 miles travelled in 38 minutes and an elevation of 19,000 feet. The highest hourly wind velocity was 95 miles from the north on this date at an elevation of 18,500 feet. As these balloons are only about 20 inches in diameter when released from here, the fact that some can be retained in the observing field to a distance of 23 miles indicates an efficient observing staff, a high quality observing "Watts" theodolite, and a remarkably clear atmosphere. It is expected that owing to freedom from clouds during the summer and autumn months that a fine series of balloon ascents will be made here.

I would again respectfully urge that the seismographs which were ordered in England some time ago be forwarded as soon as possible, and also that an electric recording chronograph be installed here in connection with our star transit observations for the time service.

Appendix "D"

The Director of the McGill University observatory reports as follows:—

WEATHER SERVICE

The routine meteorological observations prescribed in Form A have been made without interruption. Continuous records of the barometric pressure, temperature, sunshine, rainfall and relative humidity have been taken and properly registered. The 8 a.m. and 8 p.m. telegraphic reports have been punctually transmitted to the Canadian National Telegraph Company and the prescribed returns and copies from our registers mailed to the Central Office monthly. A daily summary of the preceding twenty-four hours' weather which includes pressure, temperature, direction and velocity of the wind at two hour intervals, and sunshine, humidity and precipitation has been given to the Montreal Gazette each night, excepting Saturdays, at 8 p.m. Less systematic reports are given to the Star whenever requested and to various other papers. Inquiries from the French press are relatively rare and we would be glad to encourage them.

A delay in the issue of our Monthly Weather Abstract from July, 1921, to the beginning of the present year was occasioned by the Gazette Printing Company deciding to charge for the 100 copies we require monthly. For many years the Gazette had printed free from 75 to 100 copies for the observatory and 700 copies for the Natural History Society of Montreal. Until five years ago we understand this society distributed a large part of their supply, and since then have allowed an accumulation. The Gazette apparently received an erroneous impression that the Meteorological Service was willing to pay for all these 800 copies. On explanation that the Meteorological Service in no way authorized the issue to the Natural History Society, the printing of their 700 copies was discontinued in July. A warrant for the printing of 100 copies monthly for the Observatory by the Gazette was issued by the Govern-

ment printing office on the authority of the Meteorological Service and the arrears of issues since July have been brought up nearly to date, the issues for February and March being at present under way. The allowance for the printing of the Abstracts is appreciated and we think highly justified. Numerous inquiries involving much labour in the reply are readily met when the printed form is available. We received an indication of the value of this publication by the demands made for it during the interruption. It had been issued for forty-seven years unbrokenly.

The daily forecast from Toronto is received over the telephone very regularly about 11 a.m. and many inquiries, systematic and desultory are answered. The delivery of the typewritten daily bulletin is delayed until usually after 1 p.m. and have had occasion to write or telephone the Canadian National Telegraph Company about irregularities and failure in its delivery. The Daily Weather map comes regularly with the mails. The Monthly Record we have found invaluable in answering inquiries as to climatic data of other Canadian stations and we have had the copies for each year since 1916 bound into book form for ready reference.

Of corporations and individuals making irregular inquiries on recent weather conditions, the railroads and express companies and various claims agents are most prominent. Manufacturers, consulting engineers, shippers, educational institutions and legal firms all have occasion for making inquiries. When the civil courts are in session, the legal fraternity do not hesitate to subpœna the production of our weather records in court on short notice and often to our great inconvenience. We have always given free and certified copies of the desired records to any lawyer or client desiring the same, with the warning that if subpœnaed to appear in court, we must make a personal charge for our services. These charges are not infrequently unpaid but have lessened the number of subpœnas received.

No new equipment has been added to the observatory. We have had one barometer thoroughly renovated, and various minor repairs attended to by Mr. A. Stirling, whose expert services and moderate charges are gratefully acknowledged. The Callendar Recorder for differences of temperature has been shipped recently to the Meteorological Office, Toronto, for Mr. Patterson's use. The anemometer is exposed on the summit of Mount Royal and the sunshine recorder on the roof of the Physics building. The screen, rain-gauge and other instruments are all on the observatory premises.

We should be glad to undertake an investigation of the distribution and intensities of rainfall over the city of Montreal were the necessary automatic gauges available. The location of these could easily be arranged as many engineers with suitable premises would be glad to attend to the collection of the records, knowing that information on this subject is of peculiar interest to their practice. The city records have shown us already interesting comparisons and differences.

The staff responsible for the weather observations are Mr. George Alberga, B.Sc., Miss M. Gilman and the writer.

On week days in the usual course, the first-named makes, records and reports the observations taken just before 8 a.m. and 8 p.m. and shares with Miss Gilman the labour of keeping the books and returns up to date. He is unable to give more than an hour night and morning to Observatory work. On week days, in addition to her office work and correspondence, Miss Gilman attends to telephone calls and routine inquiries, time signals, etc, etc.

The writer attends to extra observations for Sundays, week ends or holidays and answers all letters and special inquiries. In the past year he has attended to over 25 per cent of the routine observations and chores. The lady has given efficient service for nearly four years, and we shall be fortunate as well if Mr. Alberga's services can be retained. Owing to the small pay, it is difficult to have the services of a student or instructor in the university while the college session is on, and just as difficult to retain one when it is over. This involves usually a new apprentice each summer with the necessity of practically supervising his efforts for months. In this connection the

local adoption of Daylight Saving Time increases the difficulty as a part time clerk can rarely secure other work which permits his presence at the observatory at 9 a.m., nor does he care to interrupt his evenings to regularly report for 9 p.m: even if he is not otherwise enjoying the summer vacation. The writer, living in the building, finds his proximity to the work almost a necessity in order to attend to the work on Sundays, holidays, vacations of the staff, night inquiries, and noon hours. An extension telephone enables communication with the observatory over night practicable. This, however, is rarely used.

We have frequently commented on the unsuitability of the present observatory site. This is due to the field of view being obstructed by neighbouring buildings and the mountain. Sky observations, cloud observations, and recognition of various atmospheric optical phenomena are handicapped unless the observers are continually observant both while on and off the premises. The university surroundings and the congenial atmosphere of a university offset with their advantages other minor limitations.

B—THE TIME SERVICE

Four astronomical clocks have been kept regulated, the two Howard clocks on mean time and the Riefler and Ballon on sidereal rate. Observations of about 500 star transits were made on 86 nights. These observations were made with the Troughton and Simms transit with micrometer eyepiece which registers 15 contacts on the chronograph during a star transit. The Riefler sidereal clock was thus regulated and the others by intercomparisons several times daily. Several chronometers are also kept rated. The Howard clock that transmits the signals to the public has been running over 40 years and gives good service. Only minor repairs to any of the clocks have been required in the year. The results of 19 time exchanges with Toronto have been separately submitted. We have fortunately been able to have almost daily checks on our time through the kindness of Mr. F. Redpath, who possesses an excellent Riefler clock and makes chronographic comparisons of our time, his own and the Arlington signals.

The chief subscribers to our time service are the C.P.R. and G.T.R. railroads. The master clock of the C.P.R. is regulated by our ticker and the signals sent through their line by hand and key, the operator following the beats of their clock.

The Grand Trunk signals are sent by an electric signal clock set in beat with our standard. This is not entirely safe or satisfactory. About eight jewellers have time tickers installations and others receive signals over the telephone for rating purposes. Signals are sent at noon to the city stations on the fire alarm circuit. The time ball for the Harbour Commissioners is dropped at noon. It is an unsatisfactory condition that the ball is not raised except in the navigation season, the harbour office being content with the ringing of a bell. No omissions to throw the switch on week day noons have been made in many years. Failures of current in the circuit are not uncommon. We believe the memorial clock tower of the Harbour Commissioners with the noon time-bomb proposed will be soon completed. The present time-ball is invisible to much of the harbour. We have not learned whether the noon bomb will be fired on Arlington signals or ours, but trust the past failures in the electric circuits will be impossible. For a visual signal the appreciable differences of any observatory times, being within the second, will be negligible for public purposes.

Many unknown individuals and firms call for the time, roughly the nearest minute, when recourse to the Telephone Company would serve their purpose equally well. We are, however, unable to discriminate and refuse no one.

In the course of the past year we were fortunately enabled to engage Mr. M. A. Downes, B.Sc., to act as time observer. He has made over 80 per cent of the time observations mentioned and makes the various clock comparisons. In addition, being

familiar with the weather service, he has made many observations outside his prescribed duties, relieving others. Mr. Downes comes in the morning and evening on week days. The writer appreciates the relief this addition to the staff has brought and the liberty to leave the city, when college duties permit, for a month's vacation in the summer.

Greatest economy in supplies, heat if not fuel, and cleaning has been observed.

The financial statement required may be had from the bursar of the university, who handles all funds directly.

We regret being absent in June when the observatory was inspected by Mr. Patterson, of the Meteorological Office, and trust Mr. Downes, the assistant in charge at the time, did his best to meet his wishes.

The plans of the university for extensions do not, as yet, include a prospect of an astronomical observatory. The site on Westmount Hill, 33 acres belonging to the university, may charm some wealthy patron of science to some day make a benefaction to this end. In which case, the co-operation of the Government and the university towards including with it an efficient meteorological observatory is inherently reasonable.

REPORT OF L. A. DEMERS, WRECK COMMISSIONER

Formal investigations during the year	18
Preliminary inquiries during the year	5
Departmental inquiries during the year	4

During the calendar year 1921 there were 260 casualties reported to the department, the tonnage of same being 588,503 net, and the stated damage $1,809,328, while 38 lives were lost.

Of the total number of casualties 219 were to coasting and sea-going vessels, the tonnage of same being 546,791 net, and the stated damage $1,581,328, while 20 lives were lost. The remaining 41 casualties were to inland vessels, the tonnage of same being 41,712 net, the stated damage, $228,000.

In 137 casualties to coasting and sea-going vessels and 18 casualties to inland vessels the amount of damage is not stated.

Fifty-six of the casualties to coasting and sea-going vessels, made up of 28 steam and 28 sailing vessels, resulted in total losses, and of this number 49 were Canadian, 1 British and 6 foreign vessels.

Eleven of the casualties to inland vessels resulted in total losses, of which 9 were steam and 2 sailing vessels, being 9 Canadian and 2 foreign.

The casualties are given under the following headings:—

COASTING AND SEA-GOING VESSELS

Collisions	47
Founderings	12
Missing vessels	2
Misscellaneous accidents, fire, loss of sails, etc	59
Strandings	99

INLAND VESSELS

Collisions	14
Founderings	5
Miscellaneous accidents	5
Strandings	17

SESSIONAL PAPER No. 28

STATEMENT of investigations into wrecks and casualties which occurred to British, Canadian and Foreign vessels, held during the fiscal year 1921-22

Name of ship and official number	Port of Registry	Remarks
Beaverton 125440	Newcastle	On August 14 was stranded on Sisters island, St. Lawrence river. Formal investigation was held on Aug. 30 before Captain L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Chas. Lapierre and Capt. A. Lefebvre, acting as nautical assessors, at Montreal. *Finding:* Captain, Oscar Wing, and 1st mate, Alex. Booth, exonerated from blame. Pilot, J. T. M. Barry, held to be wrong. He is severely reprimanded and ordered to pay $100 towards defraying cost of investigation.
Brant County	Norwegian	On December 1, stranded near Brule Sand bank, St. Lawrence river. Formal investigation was held at St. John, N.B., on February 16, before Capt. L. A. Demers, assisted by Capt. A. J. Mulcahy and Capt. J. Hall, acting as nautical assessors. *Finding:* Stranding due to non-operation of the range light at Cape Brule.
Canadian Exporter 141703	Montreal	On July 31, stranded on Willapa Shoal, Washington State. Formal investigation was held at Vancouver, B.C., on August 13, 14, 16 and 17, before Capt. John D. Macpherson, Wreck Commissioner for B.C., assisted by Commander F.W. Evans and Capt. J. B. Radcliffe, acting as nautical assessors. *Finding:* Vessel was navigated in a careless and unseamenlike manner. Master and 1st mate in default. No blame to be imputed to Owners, Agents, equipment, other officers or crew. Master's certificate of William Bradley is suspended from July 31, 1921, to January 31, 1922, and that of 1st mate, Newton Campbell, from July 31 to November 30, 1921.
City of Brunswick 221007	Tampa, Fla	On August 26, stranded on Sister Ledge, entrance to Halifax Harbour. Preliminary inquiry was held at Halifax on August 31, by Commander H. St. Geo. Lindsay. *Decision:* Master showed poor judgment and apparently lost his nerves at a critical time.
Celtic (Fishing boat) 122538	Vancouver, B.C	On July 15 collided at mouth of Rivers Inlet and lives of the two occupants of Fishing Boat were lost. Formal investigation was held at Vancouver on September 22, 23 and 24, before Capt. John D. Macpherson, Wreck Commissioner for B.C., assisted by Capt. Geo. Ford and Capt. A. P. Williamson, acting as nautical assessors. *Finding:* Collision entirely due to the wrongful act of the mate, Julius Larson, who was in sole charge of the "Celtic" at the time of the collision. His certificate is suspended from Sept. 24, 1921, to March 24, 1922.
Canadian Importer 141568	Montreal	On August 17 and September 13 was damaged when arriving at Victoria. Formal investigation was held at Vancouver on November 24, 25, 28, and 30, before Capt. John D. Macpherson, Wreck Commissioner for B.C., assisted by Capt. A. P. Williamson and Capt. T. J. Esmonds, acting as nautical assessors. *Finding:* Master Carl R. Bissett, and Chief Engineer, F. C. Brown, equally to blame. They are severely reprimanded.
Corunna 99224 and Canadian 125427	Montreal / Liverpool	On September 28, collided in Montreal Harbour. Preliminary inquiry commenced at Montreal on October 17, by Capt. L. A. Demers, Dominion Wreck Commissioner but not completed, owing to dispersal of witnesses.
Canadian Recruit 141366 and Maskinonge 131422	Montreal / Liverpool	On August 18 collided near Stone Pillars, St. Lawrence River. Formal investigation was held at Montreal on August 25, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. G. M. Horsburg and Capt. Chas. Lapierre, and at Quebec on October 21, Capt. Chas. Lapierre and Capt. F. Nash acting as nautical assessors. *Finding:* Master of "Maskinonge," B. R. Griffith, in default for violation of Art. 15, 16, 27 and 29, but on account of his previous good record, the Court recommends the issuance of a Mate's certificate during the term of suspension of his Master's certificate, viz., from October 21, 1921 to April 21, 1922. *Pilot:* Samuel Rioux, also in default for concurring in the maintenance of an immediate speed in fog, and for not sounding the fog horn. The Court taking into consideration his illness due to a fall whilst in the execution of his duties, only suspends his license for the remainder of the season of navigation.
Dredge No. 15 Owned by P.W.D.	Ottawa	On September 1, capsized whilst in tow of tug "F. W. Roebling," off Cape Sambro, entrance to Halifax Harbour. Formal investigation was held at Halifax on February 1, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Neil Hall and Capt. T. R. Coffin, acting as nautical assessors. *Finding:* Master of tug "F. W. Roebling," Thos. Omiston, exonerated from all blame for damage incurred.
F. W. Roebling 113782	Halifax	
Dalhousie City 130312	Toronto	On July 7, Mrs. Rita Glass was drowned from a canoe while S.S. "Dalhousie City was attempting a rescue, on Lake Ontario. A formal investigation was held at Toronto on August 28, before Capt. L. A. Demers, Dominion Wreck Commissioner. *Finding:* Direct cause of fatality was the fact that a rope was thrown down without orders, but with the best intention. Master exonerated, but cautioned to exercise better judgment in future. Mate also cautioned to exercise more alacrity in the execution of orders.
Granite 133810 and Kamouraska 131384	Lunenburg, N.S. / Liverpool	On August 27, collided off Sydney, C.B. Preliminary inquiry was held at North Sydney on November 23, by Capt. J. Sutherland. No formal investigation on account of difficulty in getting witnesses together.

STATEMENT of investigations into wrecks and casualties which occurred to British, Canadian and Foreign vessels, held during the fiscal year 1921-22—*Continued*

Name of ship and official number	Port of Registry	Remarks
Goulet, Rene..... Inspector of Gas Buoys.	Sorel.....	Charges preferred against him by Odilon Hebert, re misappropriation of Government goods. Departmental inquiry was held at Sorel, on July 10, by Capt. L. A. Demers. *Decision:* Hebert's charges against Goulet exaggerated and actuated by personal feeling. Recommended that suspension of Hebert be maintained and Goulet be reinstated owing to his competency and previous record, as he is only guilty of trivial indiscretions.
Impoco..... 135238	Sarnia.....	On April 5, stranded on Blond Rock, N.S. Formal investigation was held at Halifax, on April 13, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Neil Hall and T. R. Coffin, acting as nautical assessors. *Finding:* Master W. R. Smultzer, exonerated from all blame. First Officer, Charles E. Pope, for default for failing to supervise steering; to make himself acquainted with state of tide; to call Master, as instructed; to obtain proper bearing of objects in view; to keep proper and efficient look out. His certificate is suspended from April 13, 1921, to April 13, 1922.
Innerton..... 142838	Newcastle-on-Tyne.	On September 12, stranded on Red Island, St. Lawrence River. Formal investigation was held at Quebec on September 21, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Chas. Lapierre and Capt. R. G. Sprague acting as nautical assessors. *Finding:* Master and Officers exonerated from all blame. Pilot, Arthur Lachance, solely in default and his license is cancelled.
John Ruggee..... 141375	Montreal.....	On June 1, stranded at Pointe Noire, Saguenay River. Formal investigation was held at Montreal on June 13, before Capt. L. A. Demers, Dominion Wreck Commissioner. *Finding:* Master A. R. Bassett, reprimamded for not asserting his authority and cautioned to do so when a question of seamanship is involved. Pilot, Hermenegilde Lachance is fined $50 and cautioned that he will be more severely dealt with if found in default in future.
Keyingham..... 122966	Sunderland, Eng....	On May 14, stranded on Bark Reef, Saguenay River. Formal investigation was held at Quebec on May 26 and June 2, before Capt. L. A. Demers, Dominion Wreck Commissioner assisted by Capt. Chas. Lapierre and Capt. F. Nash, acting as nautical assessors. *Finding:* Officers and Pilot exonerated. Casualty due to fact that pilot expected to hear bell buoy, which failed, and to an act of God.
Keywest..... 125458 and Oliver Mowatt..... 92384	Newcastle..... Bowmanville.....	On September 1 collided 1½ miles west of Main Duck, resulting in loss of three lives and schooner. Formal investigation was held at Montreal on September 17, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Chas. Lapierre and Capt. A. Lefebvre, acting as nautical assessors. *Finding:* Master of "Keywest," D. Wm. Whitely, found in default and his certificate is suspended from September 16, 1921, to September 16, 1922. Second Officer C. F. Gildman, also found in default, but as he holds no certificate, he could only be reprimanded. "Oliver Mowatt" also indirectly contributed to the disaster in not meeting the requirements of Article 9 of the Rules of the Road for the Great Lakes.
Leboeuf, Celestin.....	.....	Captain Lebœuf is charged of having secured a Master's certificate under false representations. Departmental inquiry was held at Valleyfield, on June 10, at Montreal on June 13 and at Quebec on June 17, by Capt. L. A. Demers, who recommended that Capt. Leboeuf's certificate be returned to him as he is in no way to blame for the apparent contravention of the regulations re Masters and Mates.
Lady of Gaspe..... 78554	Quebec.....	On August 8 stranded on Thrump Cape Shola, entrance to Halifax Harbour. Formal investigation was held at Halifax on August 11, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Neil Hall and Capt. C. O. Allan, acting as nautical assessors. *Finding:* Stranding due to indifference and apparent carelessness in the navigation of the vessel by the Captain, Neil Nicolson, and first Officer, D. Wesley Munro. Captain's certificate is suspended from August 11, 1921, to August 10, 1922. First Officer severely reprimanded and cautioned to be more careful in future.
Maplehill..... 116764 and Scarboro (Yacht)	Toronto.....	On July 23 collided in Lake St. Louis. Preliminary inquiry was held at Montreal on July 28 by Capt. L. A. Demers. Formal recommended but not held.
Mina Brea..... 125773	Toronto.....	On July 30, stranded off Matane and again on August 1, one mile above Sorel. Formal investigation was held at Montreal on August 17 and 18, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. R. G. Sprague and Capt. P. St. A. Robertson, acting as nautical assessors. *Finding:* First stranding—Captain I. R. Owen in default and his certificate is suspended from August 17, 1921, to October, 16, 1922. He is further criticized for not accepting services of tug "Lord Strathcona." Chief Officer E. J. Jones, also in default and his certificate is suspended from Aug. 7, 1921, to February 10, 1922. Second Stranding: Pilot Houde committed a grave error of judgment. He is warned and fined $100.
Maillet, David.....	.....	Charges of alleged misappropriation of public stores. Departmental inquiry was held at Richibucto, N.B. on July 6, by Captain L. A. Demers. Maillet is found guilty and appointment of a fit successor is recommended.
Pilots.....	Montreal.....	Charges of breach of discipline preferred against Pilots J. N. Raymond, J. A. Mayrand, J. C. Gauthier, Thos. Perron. Departmental inquiry was held at Montreal in November and December. Mayrand and Perron are cautioned.

STATEMENT of investigations into wrecks and casualties which occurred to British, Canadian and Foreign vessels, held during the fiscal year 1921-22—*Concluded*

Name of ship and official number	Port of Registry	Remarks
Rygja..... and Mapledown..... 141836	Bergen, Norway... Montreal.....	On July 13, collided near Cap Sante, St. Lawrence River. Formal investigation was held at Quebec on July 20 and 21, before Capt. L. A. Demers, Dominon Wreck Commissioner, assisted by Capt. Chas. Lapierre and Capt. A. Lefebvre, acting as nautical assessors. *Finding:* "Rygja" alone to blame for collision. Captain Johannes Hanges in default for acquiescing and permitting Pilot to perform evolutions in violation of Article 15, 22 and 29 of the Rules of the Road. First Officer, L. Skoashum, also in default for not seeing that a lookout was stationed and Chief Engineer, B. Mekie, for failing to record time of orders received by means of telegraph.
Rapids King..... 122407	Montreal.....	On July 16, stranded in Long Sault Rapids. Formal investigation was held at Montreal on July 29, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Chas. Lapierre and Capt. A. Lefebvre, acting as nautical assessors. *Finding:* Master Geo. Batten, and Mate Wm. Blake, exonerated from all blame.
Sault St. Louis..... 126455	Montreal.....	On July 24, stranded off Caughnawaga. Preliminary inquiry was held at Lachine on July 29, by Capt. L. A. Demers. *Decision:* No further action required, except to draw the attention of those having authority over the issuance of the licenses, to the fact that the ferry was carrying more passengers than permitted by her license.
Volunda..... 138659	Pictou, N.S.....	On July 29, stranded in Neil's Harbour, Nova Scotia. Formal investigation was held at Halifax on August 9, before Capt. L. A. Demers, Dominion Wreck Commissioner, assisted by Capt. Neil Hall and Capt. C. O. Allan. *Finding:* Captain Jas. Mickle was remiss in not being on the bridge. Owing to his long and successful career, The Court deals leniently with him and only suspends his certificate from Aug. 9, 1921, to February 8, 1922 Second Mate, Wm. Cross, having no certificate, is severely reprimanded.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1, to December 31, 1921

COASTING AND SEA-GOING WRECKS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Feb. 11..	Anyox 150273	3	Vancouver, B.C.	Schr... Wood. Steam.	749	Ladysmith Ocean Falls.	Trincomali Channel.	Stranding S. Snoddy.		Part. $3,000.
May 31 ..	Augusta 212055	7	Wrangell, U.S.A	Wood. Gaso.	17	Prince Rupert Ketchikan.	Ingwell Is.	Foundering M. Euge.		Ship, total cargo: $95.
Aug. 2...	Arthur M. 96945	21	Saint John, N.B	Schr. Wood. Sail.	97	Saint John, N.B Waterside, N.B.	Herring Cove, N.B.	Stranding H. M. Hatfield.		Total, $700.
Aug. 6 .	Astraea 106993	23	West Hartlepool	Schr. Steel. Steam	2,080	Newport Montreal.	Long Point Bank, St. Lawrence River.	Stranding G. Mann.		Part.
Aug. 15...	Aranmore 98569	31	Ottawa	Schr. Iron. Steam.	502	Quebec Natashquan.	Natashquan. Harbour.	Stranding Jos. Boucher.		Part.
Oct. 4..	Arizona 107823	20	New York	2-masts Steel. Steam.	6,497	Boston Vancouver	San Juan Is., Gulf of Georgia	Stranding C. R. A. Anderson		Extensive damage.
Oct. 15...	Ada A. McIntyre 138893	3	Saint John, N.B.	Schr. Wood. Sail.	422·57	New York New Mills.	Off Arichat, N.S.	Stranding W. D. Barton		Part, $2,800.
Nov. 21..	Alice Phoebe 90719	35	Charlottetown, P.E.I.	Schr. Wood. Sail.	70	Sydney, N.S. Charlottetown, P.E.I.	Port Hawkesbury, N.S	Stranding Frs. Blake.		Part, $1,000.
Nov. 22..	A. Tremblay 138262	5	Quebec	Schr. Wood. Steam.	147·46	Montreal Gaspe.	2 miles below Matane..	Damaged in gale Ulric Tremblay.		Part.
Nov. 30..	A. W. Chisholm 141698	1	Lunenburg, N.S.	Schr. Wood. Sail.	146	Halifax. Barbadoes.	70 miles outside Halifax harbour, S. by W. ½ W. No. Atlantic.	Damaged in gale J.E. Tanner.		Part.
Dec. 2...	Amur 98073	31	Vancouver	Schr. Steel. Steam.	590	Ladysmith Vancouver.	Race Point, Porlier pass, B.C.	Stranding J. McNaughton.		Part, $14,250.
Dec. 5...	Alda 9397	22	Norwegian	Schr. Steel. Steam.	152	Chatham, N.B Ireland.	Miramichi river bay....	Stranding A. Madsen.		Part.
April 27...	Bona II 141264	2	Parrsboro, N.S.	Schr. Wood. Sail.	415	St John, N.B. Keywest, U.S.A.	15-miles N. of Cuba, No. Atlantic.	Explosion S. F. Knowlton.		Total.
May 6...	Bessie F. Keefer 96931	31	Charlottetown, P.E.I.	Schr. Wood. Sail.	79	N. Sydney Charlottetown.	Malmesley Beach, N.S..	Foundering M. Van Iderstein.		Total.

July 1...	Bermuda..... 111532	21	Vancouver.....	Tug..... Wood. Steam.	48	Swanson Bay ..... Prince Rupert.	Banks Island, B.C.....	Stranding..... Louis Hagen.	.....	Part.
July 19...	Binghamton.....	32	Panama.....	Schr..... Iron. Steam.	1,549	Boston..... Riga.	Gannet Rock. ..... Dry Ledge.	Stranding..... M. L. Gilbert.	.....	Total.
Aug. 22...	Berenice R..... 141133	2	Lahave, N.S.....	Schr..... Wood. Sail.	324	Liverpool, N.S..... Campbellton, N.B.	30 miles S.E. Newport, mouth of Baie des Chaleurs.	Burnt..... G. A. Hangton	.....	Total, $56,000.
Sept. 13...	Bellerby..... 52439	23	West Hartlepool.....	Schr..... Steel. Steam.	1,966	Montreal..... Bremen.	Isle Ronde, St. Lawrence river.	Stranding..... W. A. Parkinson.	.....	Slight damage.
Sept. 30...	Baleine..... 129916	14	St. Johns, Nfld.....	Trawler.... Iron. Steam.	154	Port Hawkesbury..... Fishing.	Cape Hogon, N.S.....	Stranding ..... Gus Hollberg.	.....	Total, $125,000.
Oct. 10...	Brumath..... 141846	2	Quebec.....	Schr..... Steel. Steam.	661·83	Cape Cove..... Montreal.	Bouchard Is., St. Lawrence river.	Stranding..... Adrien Dubé.	.....	Slight.
Dec. 1...	Brant County..... 143385	6	Bergen, Norway.....	Schr..... Steel. Steam.	3,130	London..... "	Banc Brûlé, St. Lawrence river.	Stranding..... J. Talmstrom.	.....	Part.
Dec. 3...	Borulla..... 138681	4	Vancouver.....	..... Wood. Gaso.	39	Seattle, Wash..... Victoria.	Lake Union, Wash.....	Mast broken ..... F. R. MacFarlane.	.....	Part. $35.
Dec. 7...	B. & C..... 100547	28	Digby, N.S.....	Sloop..... Wood. Sail.	14	Tiverton..... Meteghan, N.S.	Petit Passage, N.S.....	Stranding ..... S. Foote.	.....	Total, $100.
Dec. 18....	Blossom Heath..... 137494	5	Montreal.....	Schr..... Steel. Steam.	3,798	New York hr.....	New York hr.....	Collision with *Robert P. Murphy*. I. F. Morrison.	.....	Part.
Jan. 1...	Canadian Seigneur... 141366	2	Montreal.....	Schr..... Steel. Steam.	3,554	Montreal ..... Rotterdam.	Montreal harbour.....	Stranding ..... J. E. Faulkner.	.....	Part.
Jan. 15...	Cerito..... 130944	8	Lunenburg.....	Schr..... Wood. Sail.	9·47	Gibraltar..... Catalina, Nfld.	Lat. 37·23′ N ..... Long. 12·38′ W.	Foundering ..... H. J. Edgecombe.	.....	Total.
Jan. 26...	Celeste D..... 141572	1½	Weymouth, N.S.....	Schr..... Wood. Sail.	595	Pensacola..... Lahave, N.S.	Lat. 28·37′ N., Long. 79·50′ W. E. Atlantic.	Pumps trouble ..... P. Robertson.	.....	Slight.
Feb. 2...	City of Vancouver.... 150255	1	Vancouver.....	Schr..... Steel. Steam.	3,525	....	Approach of Esquimalt Dry Dock.	Collision with *Armentières*.	.....	Part.
Feb. 20... Apl. 8	Canadian Warrior..... 140960	2	Montreal.....	Schr..... Steel. Steam.	1,453	Sydney, N.S..... Lévis, Que.	Near Lower Traverse, St. Lawrence river.	Stranding ..... P. A. Pines.	.....	Slight.
Mar. 2..	Canora..... 138800	3	Quebec.....	Ferry..... Steel. Steam.	940	Port Mann..... "	Port Mann	Damaged in loading.... Geo. Brown.	.....	Part, $3,000.
Mar. 20...	City of Colombo..... 10490	12	Glasgow.....	Schr..... Steel. Steam.	3,909	St. John, N.B..... Philadelphia.	Lat. 44·32′ N., Long. 66·3½′ W. Bay of Fundy.	Stranding ..... J. J. Robertson.	.....	Total.
April 4...	Canadian Maid 141416	1½	Lunenburg, N.S.....	Schr..... Wood. Sail.	294	St. Andrews, Fla.....	....	Missing.....	7	Total.
April 11...	Canadian..... 125427	14	Montreal.....	..... Steel. Steam.	1,444	Glasgow..... Sydney, N.S.	Glasgow harbour.....	Collision with *Leicester*. E. J. Stauffer.	.....	Part, $30).

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COASTING AND SEA-GOING WRECKS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
May 8	Canadian Pioneer 140958	2	Montreal	Schr. Steel. Steam.	3,549	Halifax Genoa.	Lat 37-48' N., Long. 64-48' W. E. Atlantic.	Pump trouble P. Robertson.	.....	Slight.
May 9	Chicoutimi. 144559	2	London, Eng.	Tug. Steel. Steam.	12	Bagotville Port Alfred.	Ha' Ha' Bay, Saguenay river. Port Alfred.	Propeller broken Chas. Simard.	.....	Part.
May 12	Chilliwack 119063	18	Vancouver	Schr. Steel. Steam.	222	Vancouver Wayports.	Nanoose harbour, Gulf of Georgia.	Stranding. C. B. Smith.	.....	Part, $5,000.
June 4	Canadian Inventor 141705	1	Montreal	Schr. Steel. Steam.	3,384	Vancouver Nanaimo.	Active Pass Helen Point.	Stranding Frank Dudley.	.....	Part.
June 7	Celestial Empire 106769	24	Vancouver	Ketch Iron. Steam.	80	Prince Rupert Swanson bay.	White Rocks	Propeller trouble F. J. Brown.	.....	Part, $4,000.
July 1	Canadian Trooper. 141431	2	Montreal	Schr. Steel. Steam.	1,952-52	Montreal Rouen.	Rouen harbour	Stranding R. D. Maxwell.	.....	Slight.
July 3	Cambrai 158652	3	Pictou, N.S.	Schr. Wood. Sail.	529		Galveston bay, U.S.A.	Burnt	.....	Total.
July 4	Canadian Rover 141856	1	Montreal	Schr. Steel. Steam.	1,464	Halifax Ocean Falls.	Ocean Falls	Fire in bunker Alex. Forson.	.....	Part, $1,000.
July 8	Camosun 121204	16	Vancouver	Schr. Steel. Steam.	794	Vancouver Ocean Falls.	Cliff island	Stranding A. Dickson.	.....	Part, $9,000.
July 12	Canadian Trapper 141585	2	Montreal	Schr. Steel. Steam.	2,183	Montreal Antwerp.	Buoy L 58, Lake St. Peter.	Collision with Buoy L 58. W. Larmour.	.....	Slight.
July 12	Concordia 137830	4	Glasgow	Schr. Steel. Steam.	3,418	Avonmouth Montreal.	Long Point, St. Lawrence river.	Collision with wharf Jas. Morris.	.....	Part, $5,000.
July 15	Celtic 122538	14	Vancouver	Sloop Wood. Steam.	163	Vancouver	¾ miles N.E. by E. of Lone isl. Schooner Pass, Rivers inlet.	Collision with fishing boat. J. Finlay	2 on fishing boat	No damage.
July 17	Canadian Squatter 141853	1	Montreal	Schr. Steel. Steam.	1,900		Sydney, N.S.	Fire in pulp cargo D. H. MacLean.	.....	Slight.
July 31	Canadian Exporter 141703	1½	Montreal	2 masts Steel. Steam.	3,385	Vancouver Oriental Ports.	Shoalwater bay, Willapa U.S.A.	Stranding Wm. Bradley.	.....	Total.

Aug. 10...	Canadian Gunner..... 141478	2	Montreal.....	Schr..... Steel. Steam.	1,454·58	Montreal..... Demerara.	Demerara, Barbadoes..	Stranding..... J. B. Millas.	.....	Slight.
Aug. 13...	Chelchsun..... 130805	10	Vancouver	Schr..... Steel. Steam.	597	Vancouver.....	Table island, B.C.....	Stranding..... E. Stacey.	.....	Part.
Aug. 18... 19	Canadian Importer.... 141568	1½	Montreal.....	Schr..... Steel. Steam.	3,384	Vancouver..... Auckland, N.Z.	Lat. 37·39′ N., Long. 137·07′ W., Pacific Ocean.	Sprang a leak..... C. R. Bissett.	.....	Part.
Aug. 18...	Canadian Recruit..... 141366	2	Montreal.....	Schr..... Steel. Steam.	1,451	Quebec..... Sydney, N.S.	1½ miles E. of N. Channel Patch Buoy, St. Lawrence river, near Lower Traverse.	Collision with *Maskinonge*. J. H. Hubley.	.....	Total.
Aug. 26...	City of Brunswick.... 221007	1	Tampa.....	Schr..... Steel. Steam.	3,750	Mobile ..... Antwerp.	Sisters, Sambro Ledge, N. Atlantic.	Stranding..... A. A. Rossi.	.....	Total.
Aug. 27...	Canadian Aviator..... 141547	2	Montreal.....	Schr..... Steel. Steam.	2,057·47	Port Alfred..... Rouen, France.	River Seine, Rouen....	Collision with *Labor*.... E. Randall.	.....	Part. $2,200.
Aug. 29...	Con Rein..... 141287	2	Lahave, N.S.....	Schr..... Wood. Sail.	299	Bridgewater ..... Charlottetown.	Off S.E. Black isld., N. Atlantic.	Collision with U.S.A. submarine K. 4. Geo. H. Corkum.	.....	Total, Ship: $48,000. Cargo: $9,000.
Sept. 8...	Coast Guard..... 116651	17	Liverpool, N.S.....	Sloop ..... Wood. Steam.	52	Liverpool..... Yarmouth.	E.N.E. 2 miles from Little Hope isld., N. Atlantic.	Foundering..... Jas. McLeod.	.....	Total.
Sept. 18...	Calgorolite..... 150248	1	Halifax.....	Schr..... Steel. Steam.	5,511	Texas City..... Montreal.	Montreal harbour ...	Collision with dock.... Chas. M. Rowley.	.....	Part, $1,000.
Sept. 14...	Canadian Trooper.... 141431	2	Montreal.....	Schr..... Steel. Steam.	1,952·55	Port Alfred..... Rouen, France.	Rouen harbour.....	Stranding..... M. J. Ormrod.	.....	No damage.
Sept. 28...	Canadian..... 125427	14	Montreal.....	Schr..... Steel. Steam.	1,444·31	Montreal..... Shelter Bay.	Montreal harbour.....	Collision with *Corunna*. K. Laroche.	.....	Part, $1,500.
Sept. 28...	Corunna..... 99224	1	Montreal.....	Schr..... Steel. Steam.	791·5	Montreal..... Sydney, N.S.	Montreal harbour	Collision with *Canadian*. J. A. Willett.	.....	No damage.
Oct. 1...	Canadian Sailor..... 141377	2	Montreal.....	1 mast..... Steel. Steam.	1,283	St. John, N.B..... Bristol.	Off Pointe aux Trembles, St. Lawrence river.	Stranding..... Jas. Black.	.....	Slight.
Oct. 3...	C. J. B..... 126386	12	Quebec.....	Schr..... Wood. Sail.	50·58	Ste. Anne des Monts. Quebec.	Les Pellerins isl., St. Lawrence river.	Stranding..... E. Bechard.	.....	Part, $500.
Oct. 6...	Celestial Empire..... 106769	24	Vancouver.....	Ketch..... Iron..... Steam.	80·46	Vancouver..... Vancouver....	Vancouver harbour.....	Stranding..... A. E. Lewis.	.....	Slight.
Nov. 14...	Cassandra..... 124130	15	Glasgow.....	F. & A..... Steel. Steam.	5,221	Glasgow..... Montreal.	Off Pointe aux Trembles, St. Lawrence river.	Stranding..... Jas. Black.	.....	Slight.
Nov. 15...	Canadian Farmer..... 141590	2	Montreal.....	1 mast..... Steel. Steam.	1,460	Vancouver..... Nanaimo.	Nanaimo harbour.....	Stranding..... W. J. Boyd.	.....	Part.
Nov. 26...	Corporal Trim..... 97256	61	Charlottetown.....	Schr..... Wood. Sail.	57	Charlottetown,-P.E.I... Pictou, N.S.	Stewart point, Northumberland str.	Stranding..... S. Cain.	.....	Total, $1,000.
Nov. 29...	Cheakamur..... 130309	11	Vancouver.....	Schr..... Steel. Steam.	403	Vancouver ..... Kingcome inlet.	Okishotto Channel, B.C.	Stranding..... R. Wilson.	.....	Part, $7,500.

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Dec. 3..	Canadian Voyageur.. 140957.....	3	Montreal.....	Schr... .... Steel. Steam.	1,868	.....	Bedford Basin	stranding	...	Part.
Dec. 12 .	Canadian Seigneur... 141368	2	Montreal.....	Schr..... Steel. Steam.	3,554	Montreal..... Russia.	Novososisk river, Russia.	Collision with concrete wharf. J. E. Faulkner.	.....	Part.
Dec. 25...	Columbia 126899	11	Vancouver... ...	Schr..... Wood. Motor.	63·61	Vancouver... Vancouver.	Vancouver Hr. ..	Damaged by fire . J. Antle.	...	Part. $2,000.
Jan. 15..	Donald T... 141688	1	Lunenburg..... ..	Schr..... Wood. Sail.	162·55	.....	Lat. 46·02′N ..... Long. 41·15′ W. .... No. Atlantic.	Foundering	.....	Total.
Feb. 17.	Dredging Plant.....	.....	.....	.....	.....	.....	Victoria Hr...	Fouled by boom of logs in tow of tug *Clive M.*	.....	Part.
Feb. 28...	Dorothy M. Smart.... 126874	11	Digby, N.S.	Schr..... Wood. Sail.	94	Digby .... Fishing.	Liverpool harbour. ...	Stranding ..... Art. Longmire.	...	Part, $2,500.
May 20..	Dona Isabel 131035	9	Vancouver.....	Sloop..... Wood. Gas.	12	Prince Rupert.....	Oceanic Canning wharf, Skeena river.	Collision ..... U. Nashikowa.	...	Part, $800.
July 29..	Douglas B. Conrad. .. 134408	7	Lunenburg...	Schr..... Wood.	76	Halifax ..... . Fishing.	30 miles S. by E. ½ from Egg island, N.S.	Sprang a leak.. Ralph McKenzie.	.....	Part, $1.000.
Sept. 1..	Dredge No. 15.....	....	Halifax	.....	.....	.....	Off Cape Sambro, N.S.	Capsized whilst in tow of tug *F. W. Roebling.*	... ...	
Oct. 19..	David Evans..... 126947	21	Victoria	Schr..... Wood. Sail.	748	Portland, Oregon .... Cape Town, S.A.	Lat. 8·15′ S. ..... Long. 127·10′ E.... Banda Sea.	Burnt... ..... E. J. Spicer.	.....	Total.
Nov. 2...	Deborah..... 130497.	10	New Westminster...	.... Wood. Gas.	04	Prince Rupert..... Deep Sea.	Hecate strait.	Foundering ..... J. Williamson.	.....	Total, $500.
Nov. 4...	D. & G. Robert.....	.....	Plattsburg, N.Y	..... Wood. Sail.	100	Batiscan..... New York.	Lake St. Peter.	Stranding..... A. G. Robert.	.....	Part.
Dec. 5...	Donald J. Cook..... 138821	4	Lunenburg, N.S... ...	Schr..... Wood Sail.	101	Lahave, N.S..... Kingston, Ja.	Lat. 30 N. ..... Long. 58·30′ W. No. Atlantic.	Foundering..... Percy Oxner.	.....	Total, $10,000.
Dec. 29...	Defender.....	.....	Newfoundland.....	Schr..... Wood. Sail.	90	Halifax..... Newfoundland.	Peter's Ledge. .... Ent. Sydney harbour.	Stranding..... T. Keeping.	.....	Part.
Feb. 6...	Eugene Owen..... Mackay. 141165	2	Parrsboro, N.S.	Schr..... Wood. Sail.	559	Port of Spain..... Marseilles.	Lat. 41·08′ N. ..... Long. 02·40′ E. Gulf of Lyons.	Damaged in gale..... I. Essenbauer	.....	Part.

Mar. 3...	Eastholm..... 134071	8	Vancouver.....	Schr..... Wood. Steam.	118	Vancouver..... Ladysmith.	Vancouver Narrows....	Stranded..... A. Groulund.	.....	Part, $600
Mar. 26..	Edgewood..... 140956.	3	Montreal.....	Schr..... Wood. Sail.	699	.....	St. Margaret Bay.....	Stranded..... C. Richter.	.....	Part.
April 3...	E. D. Kingsley..... 141544	1½	Vancouver.....	Schr..... Steel. Steam.	541	Vancouver..... Cassidy's Landing.	Cassidy's Landing.....	Stranded.....	.....	Part, $9,000.
April 18...	Epauline..... 130804	10	Vancouver.....	Schr..... Wood. Gas.	44	Vancouver..... Prince Rupert.	Millbank sound.....	Stranded..... Tom Yoshitoni.	.....	Part, $10,000.
April 26...	E. A. Sabean.. ..... 90829.	20	Port Medway.....	Schr..... Wood. Sail.	249	Mobile..... Vera Cruz.	Lat. 27·58′ N..... Long. 93·37′ W. Gulf of Mexico.	Foundered..... P. Scott.	.....	Total.
May 30...	Esperanto.....	15	Gloucester, Mass.....	Schr..... Wood. Sail.	96	Gloucester..... Fishing.	Sable Island.....	Foundered..... T. J. Bonkam.	.....	Total.
June 30..	Edww. A. Cokan..... 141520	1½	Parrsboro.....	Schr..... Wood. Sail.	597	Walton, N.S..... Moss point, Miss.	Moss point, Miss.....	Explosion..... W. M. Cullins.	.....	Total.
Aug. 12...	Edith McIntyre..... 141079	.....	Windsor.....	Schr..... Wood. Sail.	149	Meteghan, N.S..... St. John, N.B.	1½ miles W. of Tiner.... Point, Bay of Fundy.	Stranded..... E. J. Dicks.	.....	Total, $25,000.
Oct. 11	Eastholm..... 134071	8	Vancouver.....	1 mast..... Wood. Steam.	138	Vancouver..... Fraser river.	First Narrows, Vancouver.	Collided with *Pronative*. A. Gounlund.	.....	Part, $125,000.
Jan. 22..	Fearless..... 107247	2	New Westminster.....	Tug..... Wood. Steam.	12·27	Vancouver..... New Westminster.	Fraser River.....	Collided with *Mamook*.. Geo. Mayers.	.....	Slight.
Mar. 10...	Freida E..... 138477	3	Parrsboro.....	Schr..... Wood. Sail.	669	Gulport, Miss... ..... Bahia Blanca, Arg.	Lat. 33·45′ N..... Long. 63·26′ W. No. Atlantic.	Foundered. ..... Geo. S. Bury.	.....	Total.
April 1..	Frederick H..... 141624	1	Parrsboro.....	Schr..... Wood. Sail.	426	St. George, N.B..... Norwalk, Conn.	Magaquadavic river, N.B.	Stranded..... F. G. Hawx.	.....	Slight.
July 7...	Fort St. George..... 122741	9	Sydney.....	Schr..... Steel. Steam.	4,532	New York..... Quebec.	Lat. 47·26′ N..... Long. 70·07′ W. St. Lawrence river.	Stranded..... J. W. McKenzie.	.....	Slight.
July 27...	Falls City..... 135951	8	Bideford, Eng.....	Schr..... Steel. Steam.	2,917	Dundee..... Montreal.	Contrecoeur, St..... Lawrence river.	Stranded ..... F. H. Gittaing.	.....	Slight.
Oct. 4..	Flyer..... 107712	22	New Westminster....	Tug..... Wood. Steam.	25	New Westminster..... Victoria.	Victoria harbour.....	Dinghy damaged..... M. Ingalls.	.....	Slight.
Nov. 7..	Forager..... 116412	17	Victoria.....	F. & A..... Wood. Steam.	57·31	Victoria..... Steveston.	Fraser river, B.C.....	Stranded..... H. A. Lund.	.....	Part.
Nov. 8...	Florence B..... 80829	13	Arichat, N.S.....	Schr..... Wood Sail.	31·22	Halifax..... Fourchu.	Ledge, St. Andrew's Channel, N.S.	Stranded..... E. Martin.	.....	Part.
Dec. 7...	Forager..... 116412	17	Victoria.....	F. & A..... Wood. Steam.	57·31	Ladner..... Vancouver.	Sturgeon Bank..... Gulf of Georgia.....	Stranded..... H. A. Lund.	.....	Part ship, $1,500 Cargo, 300.
May 13...	Germain L..... 141503	2	.....	Schr..... Wood. Gas.	121	Quebec..... Seven Islands.	Isle-aux-Oeufs.....	Stranded..... J. B. Blouin.	.....	Slight.

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July 28..	Genista.....	16	Boston.....	Schr..... Wood. Gas.	18	Boston.....	Brown Bank, 45 miles S.W. of Cape Sable.	Collided with *Mary G. Duff*, G. Dobson.	.....	Total.
Aug. —...	Granite..... 133810	8	Lunenburg.....	Schr..... Wood Sail.	92	No. Sydney ..... No. Sydney.	3 miles N.E. of Fairway Buoy, St. Lawrence river.	Collided with *Kanouraska*.	.....	Part, $5,940.
Oct. 2..	Gilly..... 138139	5	Quebec.....	Schr..... Wood. Sail.	71·96	Matane ..... Quebec.	Off Pointe des Monts..	Damaged in gale.. F. Boulainne.	.....	Part.
Nov. 18.	Gyp..... 120863	16	London.....	Schr..... Steel. Steam.	2,115·52	Queensborough, Eng .	Off St. Etienne, Saguenay river. Port Alfred.	Stranded..... S. W. Wood.	.....	Part.
Dec. 6...	Gunn & Anderson Bros 134507	1	Canso.....	Schr..... Wood. Sail.	362·29	Sherbrooke, N.S	Gulf of Mexico	Stranded.....	.....	Total.
April 25..	Hundovago.....	.....	Norwegian.....	.....	.....	Bergen, Norway..... Sydney, N.S. Sydney, N.S.	Flint Island...	Stranded	.....	Part.
May 16..	H. M. Flagler.....	3	New York.....	..... Steel. Steam.	6,183	Tuxpan, Mexico .... Montreal.	Montreal harbour ..	Collision..... O. A. Richardson.	.....	Part, $5,000.
May 17...	Holtby..... 127446	12	West Hartlepool.....	Schr..... Steel. Steam.	2,266	Shields, Eng..... Sydney, N.S.	Lat. 45.29′ N.. ..... Long. 58·43′ W. .... No. Atlantic.	Collided with *Lady of Gaspe*. H. G. Hewison.	.....	Slight.
July 17...	H. G. A.....	.....	Vancouver.....	Sloop..... Wood. Gas.	9	Vancouver. .. .. Fishing.	Mozier Cove. .. .. Chancellor Channel.	Burnt..... S. J. Holmes.	.....	Total, $5,500.
Aug. 21..	Hon. Hector..... Langevin. 66006	50	Quebec.....	Schr..... Sail.	90	....	Sorel	Damaged by fire.	.....	Part.
Sept. 5...	Hazel B. Mills..... 122083	14	Charlottetown... ..	Schr..... Wood. Sail.	72	Sydney. .. .. Charlottetown.	Big Bras D'Or..... ..	Stranded. ..... Sydney Mann.	.....	Slight.
Oct. 19..	Hazel Dell..... 80643	38	Charlottetown.....	Schr..... Wood. Sail.	87	Sydney..... Charlottetown.	Murray Harbour..... P.E.I.	Stranded ..... L. Boudreau.	.....	Part.
Nov. 13..	Howard..... 96822	32	Lunenburg	Schr..... Wood. Sail.	93	Port Hasting..... Charlottetown.	Pinette, P.E.I	Stranded..... G. Murray.	.....	Total. Ship, $3,000. Cargo, $1,900.
Mar. 24..	Inskep..... 140882	3	Vancouver.....	.... Wood. Gas.	17	Vancouver..... Fishing.	11 miles S.E. of Cape Calvert, Queen Charlotte sound.	Explosion..... S. B. Wells.	.....	Part, $500.

April 5...	Impoca..... 135238	8	Sarnia.....	..... Steel. Steam.	1,383	.....	Blond Rock, N.S.....	Stranded.....	.....	Part.
April 26...	Ignifer..... 124212	14	London.....	Schr..... Steel. Steam.	830	London..... Montreal.	Pointe des Monts.....	Stranded..... Fred Scott.	.....	Part.
July 26...	Innovation..... 141281	2	Lahave.....	Schr..... Steel. Steam.	190	Little Bras d'Or..... Halifax.	30 miles S.E. of Cape Canso, N.S.	Foundered..... M. H. Randall.	.....	Total, $35,000.
Aug. 19...	Itaska..... 126813	11	Lunenburg, N.S.....	Schr..... Wood. Sail.	100	North Sydney..... Bonavista, Nfld.	E. by S. 100 miles from Low point, Cabot strait.	Sprang a leak..... J. H. Petifee.	.....	Total.
Sept. 12...	Innerton..... 142838	2	Newcastle-on-Tyne....	Schr..... Steel. Steam.	3,241	Tyne..... Montreal.	Lat. 48·59′ 20″ N..... Long. 69·61′ 30″ W..... St. Lawrence river.	Stranded..... A. Harvey.....	....	Part, $37,000.
Nov. 5...	Irma..... 215723	4	New York.....	Schr..... Wood. Sail.	577	Boston ..... Sheet Harbour, N.S.	Pea Island, N.S.....	Stranded..... C. C. Clanson.	.....	Part.
Nov. 15..	Iocolite..... 134514	3	Sarnia.....	Schr..... Steel. Steam.	1,549	Montreal..... Côte St. Paul.....	Opposite Long Point.... St. Lawrence River.	Stranded..... Robt. Lang.	.....	Slight.
June 1...	John Ruggee..... 141375	33	Montreal.....	Schr..... Wood Steam.	765	Fairhaven, N.Y..... Chicoutimi.	Pointe Noire, mouth of Saguenay river.	Stranded..... S. R. P. J. Bennett..	.....	Part, $2,500.
Sept. 4...	J. E. Backman..... 141131	3	Lahave.....	Schr..... Wood. Sail.	399	Gulfport, U.S.A,..... Santiago, Cuba	Carribean Sea.	Burnt..... Chs. Shrader.	.....	Total.
Oct. 20...	Jane Anderson..... 126906	11	Halifax.....	Schr..... Wood. Sail.	53	Grand R-ver..... H. Burton, Nfld..	Francois, Nfld.....	Stranded..... Martin Hynes.	.....	
Nov. 7...	Jennie V. Merriam.... 141270	2	Parrsboro.....	Schr..... Wood. Sail.	454	Hillsboro, N.B. ..... New Haven, Conn.	Hopewell, Cape, N.B..	Burnt..... C. B. Mirriam.	.....	Total..
Nov. 12...	John S. Thom..... 122688	1	Quebec.....	Schr..... Wood. Steam.	911	Montreal..... Quebec.	Wolfe Island, St. Lawrence river.	Stranded..... A. Lacroix.	.....	Part.
Nov. 20...	Juan Fina.....	.....	.....	Tug.....	.....	.....	Little Current Channel, Georgian Bay.	Stranded.....	.....	Total.
Feb. 23...	Kaduna..... 128029	11	Liverpool.....	Schr..... Steel. Steam.	2,308	Cardiff..... Louisburg.	Off Fourchu, N.S.....	Stranded..... Robt. Owens.	.....	Part.
May 5...	Keynoghan 122966	13	Sunderland.....	Schr..... Steel. Steam.	2,329	Cardiff..... Queensboro, Eng.	Bar Reef, Saguenay..... river.	Stranded..... Geo. Clark.	.....	Slight.
Aug. 27...	Kamouraska..... 131384	10	Liverpool.....	Schr..... Steel. Steam.	2,673	Sydney..... Quebec.	8 miles N. of Flat Rock C.B.	Collided with *Granite*... D. Morgan.	.....	Slight.
Nov. 1...	Kiltuish..... 141722	1½	Vancouver.....	Sloop..... Wood. Motor.	60	Vancouver..... Vancouver.	Active Pass, B.C.....	Collided with *Pyrites*...	.....	Part.
Jan. 6...	Lingan..... 132801	10	Montreal.....	F. & A..... Steel. Steam.	2,602	Sydney..... Louisburg.	No. Atlantic.....	Rudder danaged..... A. D. Muir.	.....	Part.
April 21..	Lasqueti Chief..... 140912	3	Vancouver.....	..... Wood. Gas.	77	Lasqueti Island..... Vancouver.	Indian Island.....	Stranded..... G. C. South.	.....	Total, $2,000.
April 29...	Louisa J. Selig..... 88351	10	Quebec.....	Schr..... Wood. Sail.	66	Quebec..... St. Ann.	Beaumont Banks, St. Lawrence river.	Stranded..... Ludger Vallee.	.....	Part, $5,000.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1, to December 31, 1921—*Continued.*

COASTING AND SEA GOING WRECKS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
July 3..	Lady Kinderley. ... 150128	1	Vancouver.....	Schr..... Wood. Gas.	5·50	Vancouver. . . . Herschell island.	Trivet point	Collided with *Richard Holzoke*. G. Toellmer	.	Part.
July 3.	Lord Antrim... 113518	19	Belfast	Schr..... Steel. Steam.	2,774	. . . . .	Bay St. Lawrence, C.B.	Stranded. . . .	. . .	Slight.
Aug. 8..	Lady of Gaspe..... 78554	44	Quebec	Schr. .... Steel. Steam.	774	Boston .... Halifax.	Halifax harbour...	Stranded. . .. . Neil Nicolson.	.....	Total ship, $100,000, cargo $60,000.
Sept. 18..	Lo Olbee. 130866	10	Vancouver.	..... Wood. Gas.	27	Vancouver..... Vancouver.	Burrard Inlet	Stranded. ..... John Gilmore.	.....	Slight.
Nov. 5.	Lord Kelvin..... 139123	5	London	Schr..... Steel. Steam.	1,306	Halifax ..... Halifax.	Lat. 44·58′ 45″ N. .... Long. 61·18′ 30″ W. No. Atlantic.	Damaged in gale ..... W. Barker.	. ....	Part, $1,000.
Dec. 1..	Lila Boutilier. 133963	20	Louisburg	2 masts.... Wood. Sail.	95·89	St. Mary's..... ..... Oporto.	Lat. 41·50′ N..... Long. 10·05′ W. No. Atlantic.	Sprang a leak. . . .. W. W. Honnsell.	.....	Total.
Dec. 24...	Lorito.....	3	Vancouver	..... Gas.	.....	Vancouver.....	Vancouver harbour. ...	Collided with *Sebastian*. John Alcarino.	.....	Part, $1,000.
Jan. 11..	Marvis..... 126220	13	Vancouver.	1 mast..... Wood. Steam.	46·62	Vancouver*..... Vancouver.	Burrard inlet.	Collided with Scow No. 309. S. H. Coldicutt.	.....	Total.
Jan. 14. to 29	Martha Parsons..... 141072	2	Windsor, N.S.	Schr..... Wood. Sail.	455	Mobile.. ..... Gibraltar.	Lat. 27·30′ N ..... Long. 60·57′ W.	Deck load washed away and rigging damaged. Omar Blenn.	... .	Part.
Jan. 22...	Mamook..... 141433	1½	Vancouver. . .	..... Wood. Motor.	18·95	Britannia ..... Port Mann.	North Arm Fraser..... River.	Collided with *Fearless* Edw. Clapham	.....	Part 350.
Feb. 11...	Marion Grace..... 138764	2	Halifax	Schr..... Wood.. Gas.	81	Bellcoram, Nfld ..... New York.	St. Pierre island	Stranded. ..... John McKay	.....	Total.
April 5...	Mollie Gaskill 130427	10	St. Andrews..	Schr..... Wood. Gas.	22	Weymouth. . ..... Grand Manan.	Petit Passage. . . .	Stranded ..... Capt. Boudreau.	. . . .	Slight.
April 21..	Montrolite..... 216747	3	New York..... ...	..... Steel. Steam.	6,834	Texas City..... Montreal.	35 miles N. of Cape North.	Damaged by ice .... H. L. Grace.	....	Part, $5,000.
May 9...	Montauk..... 218808	2	New York.....	..... Steel. Steam.	4,829	New York..... London.	Lat. 40°06′ N . Long. 60°14′ W. N. Atlantic.	Propeller trouble .... W. J. Munro.	. ...	Part, $12,000.
July 13...	Mapledawn..... 141836	1	Montreal.....	..... Steel. Steam.	2,404	Quebec... ..... Montreal.	Off St. Croix bay, St. Lawrence river.	Collided with *Ryaja*..... J. P. Dufour.	.....	Part.

July 31...	Mina Brea 125773	12	Toronto	Steel. Steam.	2,566	Halifax Montreal.	20 miles below Father Point.	Stranded T. R. Owen.		Part, $10,000.
July 23...	Maplehill 116764		Toronto	Steam.			Lake St. Louis	Collided with *Scarboro*.		Part.
Aug. 2...	Mina Brea 125773	12	Toronto	Steel. Steam.	2,566	Halifax Montreal.	Sorel Point, St. Lawrence river.	Stranded T. R. Owen.		Part, $20,000.
Aug. 4...	Musquash 131307	11	Quebec	Sloop. Steel. Steam.	01	Louisburg Halifax.	7 miles S.E. of St. Esprit, C.B.	Collision D. C. Harris.		Total, $92,000.
Aug. 8...	Mary P. Harty	20	Gloucester, U.S.A.	Schr. Wood. Gas.	77	Gloucester Fishing.	S. of Seal island lighthouse, N.S.	Stranded Capt. Tobey.		Total.
Aug. 10...	Manchester Spinner 140566	3	Manchester	Steel. Steam.	2,967	Manchester Montreal.	E. of St. Croix bar, St. Lawrence river.	Collision W. E. Fuller.		Slight.
Aug. 11...	Monarch 93005	21	Gloucester, Mass.	Schr. Wood. Gas.	83	Gloucester Fishing.	9 miles S.E. from Cranberry island light.	Stranded A. Amio.		Total. $4,000.
Aug. 18...	Maskinonge 131422	10	Liverpool	F. and A.	2,671	Quebec Sydney.	½ mile E. of Buoy 64, St. Lawrence R.	Collided with *Can. Recruit*. B. R. Griffith.		Part.
Oct. 9 ..	Mildred G. Myers 121996	15	Lahave	Schr. Wood. Sail.	55	Lahave Canadian Labrador.	Grosse Isle, Canadian Labrador.	Stranded B. W. Bell.		Total, $10,000.
Oct. 13...	Maindy Hill 129781	10	Newcastle-on-Tyne	Schr. Steel. Steam.	1,149	Hull Chatham, Eng.	Louise Basin, Que	Collided with quay wall H. Duncan.		Part.
Oct. 12...	Maplefield		Liverpool, N.S.	Schr. Wood. Sail.	40·65	Pensacola	Between Florida coast and Bahama islands.	Damaged in gale Walter Wrighton.		Part. $8,000
Nov. 25...	Margaret H 130672	10	Louisburg	Schr. Wood. Sail.	75·54	Lahave Lunenburg.	Off Harrington Cove, N.S.	Stranded Angus Ernst.		Total, $8,000.
June 9...	Northshore 144929	25	Newcastle	Schr. Steel. Steam.	413	Docked in Quebec	Louise Basin, Que	Damaged by fire Jos. Boucher.		Part.
Sept. 12...	Namara 138765	3	Lahave	Schr. Wood. Sail.	99	Halifax Turks island.	65 miles N.W.E. of Turks island, North Atlantic.	Abandoned John A. Rouskey.		Total, $20,000.
Oct. 17...	Nora 122301	14	Vancouver	Sloop. Wood. Gas.	17	Prince Rupert Prince Rupert.	Brown's Passage, B.C.	Stranded M. Hamon.	1	Total, $4,000.
Jan. 6...	Oteroe 141825	1	Vancouver	Wood. Gas.	18·01	Kingcome Alert Bay.	Donegal Head, Malcolm island.	Explosion A. W. Deland.		Total, $20,000.
June 19...	Ozette 217839	3	Seattle	F. and A. Steel. Steam.	4,490	Newport News Portland, Eng.	Lat. 40° 40′ N. Long. 60° 38′ W. North Atlantic.	Boiler trouble John McD. Head.		Part, $500.
Sept. -...	Oliver Mowatt 92384	49	Bowmanville	Schr. Wood. Sail.	170		Off Main Dock, Lake Ontario.	Collided with *Keyport*.	3	Part.
Jan. 28...	Parthia	1	Sandefjorde	Schr. Wood. Sail.	485	Jacksonville Dundee.	Halifax harbour	Collided with *W. G. Warden*. Geo. Best.		Part, $10,000.
Feb. 10..	Princess Beatrice 116405	17	Victoria	Schr. Wood. Steam.	635	Vancouver Powell river.	Jedidiah, Sabine channel	Stranded W. J. Boyce.		Part.

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Mar. 6...	Permanancia..... 138409	1	Sydney.....	Schr..... Concrete. Gas.	292	Sydney..... Boston.	Langlade, West coast, Miquelon islands.	Stranded . . D. Leblanc	. .	Total.
April 18...	Pro Patria.....	17	St. Pierre Miquelon..	Schr..... Steel. Steam.	549	St. Pierre Miquelon... Halifax.	Cranberry Head, N.S..	Stranded	. .	Slight.
July 18...	Prince Albert..... 107349	20	Yarmouth, N.S.....	Schr..... Steam.	64	Kingsport..... Parrsboro.	Between Kingsport and Parrsboro.	Propeller trouble ..	....	Part.
Aug. 6...	Princess Maquina.... 133769	8	Victoria	Schr..... Steel. Steam.	979	Vancouver..... Vancouver.	Lat. 50° 27′ 58″ N..... Long. 127° 58′ 30″ W. Quatsino Sd.	Stranded Thos. Cliffe.	..	Part.
Aug. 14...	Princess Ena..... 122387	14	Victoria.....	Schr..... Steel. Steam.	82	Vancouver..... Skagway.	Johnstone strait, B.C...	Stranded . . . . C. C. Sainty.	....	Slight.
Oct. 4...	Pronative..... 131158	9	Vancouver.....	Tug..... Wood. Steam.	37	Vancouver..... Vancouver.	Patricia shoal, Burrard inlet.	Collided with *Eastholme* Carl Johnson.	....	Slight.
Oct. 24...	Parkhaven.....	1	Rotterdam.....	Schr..... Steel. Steam.	2,984	Newport News..... Three Rivers.	Three Rivers.....	Fire in coal bunker . . T. Drayer.	.....	Part.
Nov. 1...	Projective..... 138308	5	Vancouver.....	Tug..... Wood. Steam.	48	Vancouver . . . James Island.	Active pass, Gulf of Georgia.	Collided with *Pyrites*	.....	Part.
Nov. 2...	Paipoonge..... 131840	1	Montreal.....	Schr..... Steel. Steam.	1,477·99	Montreal . . . . Norfolk, Va.	Montreal harbour.....	Engine trouble..... F. H. Hawes.	.....	Part, $1,000.
Dec. 10...	Pine Tree State..... 221633	1	Seattle.....	Schr..... Steel. Steam.	9,405	Seattle..... Yokohama.	Victoria harbour.....	Collided with wharf . M. M. Jenson.	.....	Slight.
Dec. 12...	Parima..... 96643	32	Montreal.....	3 masts.... Steel. Steam.	1,875	New York .... New York.	New York	Damaged by fire ... J. Perry.	. .	Part.
Dec. 13...	Princess May..... 109860	35	Vancouver.....	Schr..... Iron. Steam.	1,022	New York..... New York.	New York.....	Collided with tug ..... C. S. Hill.	.....	Part.
Mar. 20...	Rebecca S. Macdonald 133967	3	Digby, N.S.....	Schr..... Wood. Sail.	762	Bahia Blanca.....	Lat. 23° 14′ N..... Long. 63° W. North Atlantic.	Damaged in gale..... A. A. Willie.	.....	Part.
April 2...	Rogan.....	21	Montreal.....	Schr..... Steel. Steam.	831	Havre, France..... Montreal.	170 miles E. of Cape Race.	Damaged by ice..... G. J. Moxsay.	.....	Part.

May 9...	Ryne 96727	32	Chatham, N.B.	F. and A.... Wood. Gas.	11	Pictou Magdalen islands.	8 miles off Grindstone island.	Explosion John Hemphill.		Part, $400.
June 8...	Richmond 211443	8	San Francisco	3 masts.... Steel. Steam.	4,089	Los Angeles Prince Rupert.	Grenville channel, B.C.	Stranded Jos. Tucks.		Slight.
July 13...	Rygja 70762	1	Bergen, Norway	Schr..... Steel. Steam.	2,146	Montreal Aalborg.	Montreal	Collided with *Maple-dawn*. J. Hangse.		Part.
July 11...	Rosana Barton 141575	1	Weymouth	Schr..... Wood. Gas.	130	St. John's, Nfld Nantes, France.	Lat. 37° 11′ N Long. 0° 10′ W. Mediterranean Sea.	Burnt J. Barton.		Total, $62,000.
July 25...	R. S 141204	2	Vancouver	..... Wood. Gas.	13	Vancouver Knight inlet.	3 miles SW. Hoyes Sd... Knight inlet.	Damaged by seas		Part, $300.
July 29...	Rupert N 141627	1	Parrsboro	Schr..... Wood. Sail.	378	New Campbellton, N.B. New Campbellton, N.B.	Lat. 48° 10′ N Long. 64° 10′ W. Gulf St. Lawrence.	Burnt J. J. Taylor.		Total, $70,000.
Jan. 11...	Scow No. 309	.....	.....	Scow..... Wood.	.....	Vancouver Vancouver.	Burrard inlet	Collided with *Marvin*... F. S. Carter.		Part.
Jan. 18...	Sarnolite 134515	4	Sarnia	..... Steel. Steam.	1,549	Baton Rouge	Chalmette New Orleans.	Collided with wharf C. R. Treweek.		Slight.
Mar. 9...	Skalu 141035	3	Vancouver	Schr..... Wood. Gas.	16	Vancouver Vancouver.	Off San Juan Harbour...	Loss of propeller C. N. Newbury.		Part, $300.
Mar. 19...	Stadium 130623	9	Yarmouth	Schr..... Wood. Steam.	49	St. John, N.B St. Johns, Nfld.	Miquelon harbour	Stranded Chas. Pyke.		Total, $30,000.
April 9...	Stella	12	St. Johns, Nfld	Schr..... Wood. Sail.	77	San Juan, Porto Rico.... San Pedro de Macoris.	San Pedro de Macoris...	Stranded L. Vatcher.		Part, $3,000.
June 29...	St. Charles 111618	31	Quebec	Tug..... Wood. Steam.	16	Quebec	Louise basin, Que	Collision E. Dionne.		No damage.
June 29...	Sault au Mouton 126157	14	Montreal	Schr..... Wood. Sail.	71	Quebec	Quebec harbour	Collision Ph. Boulianne.		Part.
June 29...	Stewart W 138096	41	Montreal	Schr..... Wood. Steam.	970	Quebec	Quebec harbour	Collision E. Tremblay.		Part.
Aug. 13...	Schugl Kill Bridge.... 219757	1	Newark, N.J	..... Steel. Steam.	2,000	Tampa, Fla Denmark.	Lat. 40° 40′ N Long. 56° 00′ W. Atlantic.	Engine trouble O. B. Olsen.		Part, $3,000.
Aug. 26...	Scotia 122423	14	Halifax	Schr..... Wood. Steam.	268	Halifax Drum Head.	Drum Head, N.S.	Burnt P. J. Cooper.		Total, Ship, $75,000. Cargo, $75,000.
Sept. 1...	Saturn	9	Prince Rupert	Schr..... Wood. Gas.	05	Prince Rupert Fishing.	12 miles SW. of Freeman pass, Porcher island, B.C.	Burnt D. Porter.		Total, $6,500.
Oct. 4...	Santa Elena 30005	15	Havre, France	..... Steel. Steam.	4,732	Dunkirk Amsterdam.	Channel patch, St. Lawrence river.	Stranded J. Omque.		Part.
Oct 28...	Squanta	19	Gloucester	Schr..... Wood. Gas.	81	Gloucester Fishing.	Prospect, N.S.	Stranded A. D. Malloch.		Part, $3,000.
Nov. 28...	S. F. Tolmie 141617	.....	Victoria	Bque..... Wood. Sail.	1,497·08	Vancouver Kobe, Japan.	Lat. 48° 33′ N Long. 125° 30′ W. Pacific Ocean.	Damaged in gale J. C. Stewart.		Part.

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COASTING AND SEA-GOING WRECKS

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Dec. 24..	Sebastian 117323	17	St. Johns, Nfld	Schr. Steel. Steam.	23·21	Patricia Bay, B.C Vancouver.	Vancouver harbour.	Collided with *Lorito* J. McKiernan.		Slight.
Jan. 31...	Tees 95929	27	Victoria	Schr. Steel. Steam.	441	Port Renfrew Clayoquot.	Lat. 49° 10′ N Long. 125° 54′ W. Clayoquot Sd.	Stranded Alex. Thompson.		Slight.
Mar. 6...	Turret Cape 104283	25	Montreal	Schr. Iron. Steam.	1,142	St. John Halifax.	Cape Canso, N.S.	Damaged by ice I. E. McDonald.		Part.
June 3...	Titon 141329	3	New Westminster	Schr Wood. Gas.	17	Prince Rupert Fishing.	Dead Mans point, Banks island.	Explosion H. Henriksen.		Total, $8,000.
Aug. 16...	Trawler No. 6						Hen and Chicken shoal, N.S.	Stranded		Part.
Sept. 22...	Toyooshi Maru 18162	7	Tokio, Japan	Schr. Steel. Steam.	4,343	Yokohama London.	Lat. 53° 41′ N. Long. 160° 14′ W. North Pacific Ocean.	Piston trouble K. Hosikawa.		Slight.
Dec. 18..	Transfer No. 8 141618	1	Victoria	Barge	1,124·19	Vancouver Ladysmith.	Galiano island	Stranded Capt. Campbell.		Part.
Mar. 16...	Vesla 205714	11	Tacoma	Schr. Wood. Motor.	13	Tacoma Prince Rupert.	Pitt island	Gear trouble Capt. Olsen.		Part.
July 10...	Vecht 75279	5	Rotterdam	Schr. Steel. Steam.	1,186	Montreal Rotterdam.	Buoy 65, St. Lawrence river.	Collided with buoy A. C. DeMan.		Part.
July 29...	Volunda 138658	1	Pictou, N.S.	Schr. Steel. Steam.	1,056	North Sydney Montreal.	Off Neil's Harbour, C.B.	Stranded Jas. Meskle.		Total. Ship: $250,000. Cargo: $14,858.
Nov. 22...	Vicola 150402	1	Lunenburg	Schr Wood. Sail.	113·31	Lunenburg St. John's, Nfld.	Between North Sydney and St. Johns, Nfld.	Missing E. Zellars.		Total.
April 14...	W. H. Telford 215856	4	Bayonne, N.J.	Tanker Steel. Steam.	3,379	Boston Levis.	Off Cape Canso, North Atlantic.	Damaged in ice Alex. Mackay.		Slight.
May 7...	Whiteway 141513	2	Parrsboro	Schr Steel. Wood Sail.	418	Apple River, N.S New York.	1½ miles, E. Vineyard Lt. Ship, Vineyard Sd.	Collision Chs. Pike.		Part.
June 16..	Watkena 217392	3	Philadelphia	Schr. Steel. Steam.	3,744	Montreal Oalborg, Denmark.	Between Buoys 159 and 161, St. Lawrence river	Stranded J. C. Anderson.		Part.

Oct. 13...	Wordsworth..... 143114	16	London.....	F. and A.... Steel. Steam.	2,346·60	Cardiff..... Hamburg.	Off Citrouille Pt., St. Lawrence river.	Stranded..... W. S. Wickham.	.....	Slight.
Oct. 18...	Wistaria.....	5	.....	Sloop..... Steel. Steam.	412·14	Montreal..... St. Etienne, Saguenay river.	Red island, St. Lawrence river.	Stranded..... J. P. Champion.	.....	Slight.

INLAND WATERS—WRECKS

May 29...	Acadia.. 72942	46	Montreal	Barge..... Wood. Sail.	365	Montreal.....	Montreal Harbour..	Collision..... Geo. Sedgmore.	.....	Total.
Oct. 12...	Achland. 141596	34	Montreal	Schr..... Wood. Sail.	949·38	Port Colborne Montreal.	West End Cardinal Canal	Stranded..... J. Mallette.	.....	Slight.
Nov. 24.	Arbutus 92462	34	Port Arthur	Sch..... Wood. Steam.	34	Marquette, Mich Sault Ste Marie	About 10 miles N.E. of Grand Marais, Lake Superior, U.S.A. waters.	Foundered..... A. E. Fader.	.....	Total, $2,000
Aug. 15	Beaverton 125440	13	Montreal	..... Steel. Steam.	1,357	Port Colborne Montreal.	Sisters Island, St Lawrence River.....	Stranded..... O. M. Wing	.....	Part.
April 21.	Clark Bros..... 94984	20	Toronto	..... Wood. Steam.	37·06	Toronto.....	E. Side Ferry Dock.. Toronto.	Damaged by fire ..... N. M. Miner.	.....	Part $4,000.
May 22...	Canobie..... 133826	34	Montreal.....	..... Wood. Steam.	1,051	Quebec ..... Erie, Pa.	Soulanges Canal.....	4 Propeller blades lost Leon Pregent.	.....	Part $500.
June 24...	Canobie..... 133826	34	Montreal.....	..... Wood. Steam.	1,051	Levis..... Erie, Pa.	100 yds. S. of Fortier Pt., Lake St. Louis.	Stranded..... Leon Pregent.	.....	Slight.
July 13...	City of Hamilton..... 126326	46	Ottawa.....	..... Iron Steam.	630	Montreal..... Hamilton	Iroquois Pt., St. Lawrence River	Stranded..... O. Patenaude	.....	Part.
Nov. 1...	Canobie..... 133826	34	Montreal.....	Schr..... Wood. Steam.	1,051	Quebec ..... Erie, Pa.	About 30 miles S.W. of Port Colborne, Lake Erie.	Foundered..... Leon Pregent	.....	Total $20,000.
Nov. 19...	City of New York... 116393	58	Toronto	..... Steam.	198	Trenton..... Oswego	10 miles off Stoney Pt.	Foundered..... H. Randall	8	Total.
June 21...	Empress..... 73086	43	Montreal.....	..... Steel.	372	Ottawa.....	Queen's Wharf, Ottawa	Collision..... Henry Shaver	.....	Slight.
Nov. 20..	Edna Ivan..... 107135	21	Goderich.....	Tug..... Steam.	36	.....	Little Current Harbour, Georgian Bay	Stranded.....	.....	Total.
June 13...	Howard.....	57	Duluth, Minn..	..... Wood. Steam.	97	Bay City, Mich. ..... Blond Bay, Ont.	Victoria Lt. 5 Lake.... Superior.	Stranded..... Hugh MaKenzie	.....	Total.
Aug. 16..	H. N. Jex... 137982	12	Kingston	Iron and wood. Steam.	231	Oswego..... Kingston	10 miles S.E. of Point Peter, Lake Ontario	Foundered..... Max Shaw	.....	Total, $16,000
Nov. 17...	Home Smith.. 138212	20	Midland	..... Steam.	2,526	.....	Lake St. Clair.....	Stranded.....	.....	Slight.

STATEMENT of wrecks and casualties reported as having occurred to British, Canadian and Foreign vessels in Canadian waters and to Canadian vessels in other waters, from January 1, to December 31, 1921—*Concluded.*

INLAND WATERS—WRECKS—*Concluded*

Date of Casualty	Name of Ship Official No.	Age of Ship Years	Registered Port	How rigged Iron or wood Steam or sail	Register Tonnage	Port sailed from Port bound to	Place where Casualty happened	Particulars of Casualty Name of Master	Lives lost	Loss Total or Partial
Aug. 14..	Iocolite 134514	5	Sarnia	Steel. Steam.	1,549	Montreal	Soulanges Canal	Collided with *Winnipeg.* A. S. Cameron		Part, $500.
June 14..	Jed 141378	32	Kingston	Wood. Sream.	637	Montreal Owsego, N.Y.	Lock No. 5 Cornwall Canal	Collided with Lock. J. M. Doyle		Part.
Aug. 3..	Jed 141378	32	Kingston	Wood. Steam.	637	Montreal Oswego.	Sparrowhawk, Pt.. 2 miles below Cardinal	Stranded J. M. Doyle		Slight.
July 7...	Keybell 131111	9	Montreal	Steel. Steam.	1,254	Ashtabula Montreal	Welland Canal	Collision Leon Beaupre		Slight.
Sept. 1 ...	Keywest 125458	12	Newcastle, Eng	Steel. Steam.	1,298	Montreal Toledo Island Pt.	3½ miles W. of Main Duck.	Collided with *Oliver Mowatt.* D. H. Whiteley	3 lives On *Oliver Mowatt*	No damage.
May 21...	Laketon 137906	18	Toronto	Steel. Steam.	3,248	Port Colborne. Fort William.	Between piers, Cleveland Breakwaters	Collision C. R. Albinson		Part $25,000.
Aug. 14..	Lamentia 126485	12	Montreal	Wood. Steam.	205	Soulangse Canal, At wharf.	1st Bridge, Soulanges Canal.	Collided with *Winnipeg.* J. O. Sicotte		Part, $700.
Aug. 17..	Lehigh 141839	1	Montreal	Iron. Steam.	888	Kingston. Montreal	Wolfe Island, 15 miles from Kingston.	Stranded Wm. A. Ranson		No damage.
July 11.	Mapleboro 91763	31	Owen Sound	Steel. Steam.	771	Montreal Hamilton.	Cardinal, Ont	Stranded D. H. Porter		Part, $10,000.
July 23..	Maplehill 116761	17	Toronto	Steel Steam.	1,010	Port Colborne Montreal	200 Ft. W. of Dixie Front Light, Lake St. Louis.	Collided with *Scarboro.* E. J. Shannon		No damage.
July 27.	Malton 130439	33	Sarnia	Composite.. Steam.	988	Port Colborne Quebec.	1 mile W. Cedar Bridge Soulanges Canal	Collision J. A. Smith		Part, $10,000.
July 22..	Mary P. Hall 121825	23	Montreal	Tug Wood. Steam.	43	Montreal. Iroquois.	Outside of Iroquois	Stranded H. Desgroseillers		Part.
Oct. 31..	Maplehurst 138230	29	Montreal	Steel. Steam.	732·20	Port Colborne Montreal.	Lake St. Louis	Stranded L. Menard		Part.

Nov.	7...	Mary E. McLachlan.. 138004	28	Port Arthur.....	Schr..... Wood. Steam.	7397·11	Port Arthur..... St. Ann, Ont.	Nepigon Bay.....	Foundered..... A. Mills	.....	Total ,$50,000.
Jan.	23...	Ontario No. 2..... 139778	.. 6	Montreal.....	Ferry.....	1,226	Rochester, N.Y..... Cobourg, Ont.	4 miles E. of Cobourg...	Stranded..... F. D. Forrest	.....	Part.
Sept.	1...	Oliver Mowatt..... 92384	48	Bowmanville.....	Schr..... Wood. Sail.	170	Picton..... Oswego.	S.E. by E. E. 5 miles from False Duck Lt. House, Lake Ontario.	Collided with..... *Keywest.* I. L. Van Dussen	5	Total, $10,000.
July	16...	Rapids King..... 122407	14	Montreal.....	..... Steel. Steam.	1,199	Prescott..... Montreal	Head Bernhard Isld. St. Lawrence River	Stranded..... Geo. Batten	.....	Part, $20,000.
July	24...	Sault St. Louis..... 126455	.....	Montreal.....	Ferry..... Wood. Steam.	124	Caughnawaga..... Lachine.	200 ft. from wharf, Caughnawaga.	Stranded..... J. B. Couillard	.....	Part, $300.
Aug.	29...	Sarnian..... 134011	.. 26	Port Arthur.....	..... Steel. Steam.	1,710	Goderich, Ont..... Presqu'ile, Mich.	Espenon Isld., Lake Huron	Stranded..... Thos. N. Johnston	.....	Part.
Sept.	27...	Stevan C. Hall..... 130432	41	Sarnia.....	..... Wood. Steeam.	307	Fort William ..... Port Arthur	Port Arthur.....	Burnt..... A. J. Hogue	.....	Total, $20,000.
Nov.	13...	Sarnia..... 96853	20	Port Arthur	..... Wood. Steam.	57·99	.....	Port Arthur.....	Burnt.....	.....	Total, $30,000
May	25...	Turret Cape..... 104283	26	Montreal.....	F. & A. .. Steel. Steam.	1,142	Port Colborne..... Montreal	Cornwall Canal.....	Collision..... S. E. Macdonald	.....	Part, $1,000.
May	29. .	Turret Court..... 106608	26	Montreal.....	F. & A..... Steel. Steam.	1,197	Port Colborne..... Montreal.....	Windmill Point,..... Montreal Harbour.....	Collided with..... *Acadia.* J. N. Macdonald	.....	
June	7...	Wahnapitae..... 116754	37	Toronto.....	Tug..... Wood. Steam.	50	Penetanguishene..... Spanish River	N. Pt. Bourinot,..... Lake Huron	Stranded..... P. Desonne	.....	Part, $8,000
Aug.	14...	Winnipeg..... 76512	43	Buffalo, N.Y.....	..... Wood. Steam.	274	Buffalo..... Montreal	1st Bridge, Soulanges Canal	Collided with..... *Lamentia.* Thos. Hefferman	.....	No damage.
Oct.	20...	Wm. H. Wolfe.....	34	Detroit, Mich.....	..... Steam. Steam.	1,791	Port Huron..... Detroit	St. Clair River,..... Canadian waters	Burnt.....	2	Total.

MASTERS AND SEAMEN BRANCH

Report of B. F. Burnett, Superintendent

During the fiscal year 1921-22 navigation schools were in operation at St. John, N.B., Halifax, N.S., North Sydney, N.S., Yarmouth, N.S., and at Quebec, P.Q., and marine lectures were delivered at Collingwood, Ont., and Vancouver, B.C.

Examinations for masters' and mates' certificates were held at Halifax, N.S., Yarmouth, N.S., North Sydney, C.B., Charlottetown, P.E.I., St. John, N.B., Quebec, P.Q., Montreal, P.Q., Ottawa, Ont., Kingston, Ont., Toronto, Ont., Collingwood, Ont., Port Arthur, Ont., Edmonton, Alta., Nelson, B.C., Prince Rupert, B.C., Vancouver and Victoria, B.C.

Issued during the year: 16 masters', 19 mates' and 19 second mates' sea-going certificates of competency; 14 masters' sea-going certificates of service; 55 masters' and 111 mates' coasting certificates of competency; 38 masters' and 47 mates' inland waters certificates of competency; 25 masters' and 9 mates' minor inland waters certificates of competency; 10 masters' and 3 mates' service coasting certificates, and 33 masters' temporary certificates.

PILOTAGE REPORT

Capt. G. E. L. Robertson, Director, Pilotage

The Honourable the Minister of Marine and Fisheries is the Pilotage Authority for the Pilotage Districts of Halifax, N.S., Saint John, N.B., Quebec, and Montreal, and all matters relating to pilotage in those districts are dealt with through the local superintendents at the above-mentioned places.

DISTRICT OF QUEBEC

There are fifty-seven pilots and eight apprentices in this district. The gross earnings of these pilots was $176,660.49. Only fifty-four pilots, however, worked throughout the season, whose average earnings were $3,203.87, as compared with $2,383.91 in 1920.

The total number of ships piloted inward was 1,300, of a total net tonnage of 3,602,204, and the total number outward 1,276, of a total net tonnage of 3,522,866, making a grand total of 2,576 ships, of 7,125,070 net tons. This is an increase of 2,054,428 net tons over 1920.

In this district 7 per cent of the gross earnings of the pilots is deducted for the Pension Fund. This fund is administered by the Quebec Pilots' Corporation, and amounted on December 31, 1921, to $86,607.69. In addition to the pension received from the corporation, certain retired pilots, 28 in number, receive an annual pension of $300 from the Government.

DISTRICT OF MONTREAL

There are 51 pilots and four apprentices in this district. The gross earnings of these pilots was $181,540.40. Only forty-eight pilots, however, worked throughout the season, whose average earnings were $3,698.86, as compared with $2,938.88 in 1920.

The total number of ships piloted inward was 1,220, of a total net tonnage of 3,267,054, and the total number outward 1,203, of a total net tonnage of 3,261,127, making a grand total of 2,423 ships of 6,528,181 net tons. This is an increase of 1,697,798 net tons over 1920.

In this district 5 per cent of the gross earnings of the pilots is deducted for the Pension Fund (Montreal Decayed Pilots' Pension Fund), which fund is administered, without charge, for the Montreal pilots by the Department of Finance.

Mr. C. A. Lebel, Montreal, is the acting superintendent for the Montreal District, and Mr. F. J. Boulay, assistant superintendent, at Quebec.

All expenses for the pilotage services at Montreal and Quebec are paid out of public funds. This amounted for the district of Montreal to $9,701.08 and to $58,180.71 for the district of Quebec, the latter including the cost of maintaining the pilot tender *Eureka* at Father Point, Quebec.

DISTRICT OF HALIFAX

There are fifteen first-class pilots, three second-class pilots, and four apprentice pilots in this district. The gross earnings for 1921 were $58,402.95. The total amount of expenses, including the upkeep of the two pilot tenders maintained, was $13,299.13, leaving a balance to be divided amongst the pilots of $45,103.72. The average net earnings of each first-class pilot was therefore $2,733.56.

In this district 5 per cent of the gross earnings of the pilots is deducted for the Superannuation Fund. This fund is administered, without charge, for the Halifax pilots by the Department of Finance.

The total number of ships piloted inward was 1,001, and 979 outward, making a total of 1,980, of a total net tonnage of 4,043,778, as compared with 3,736,530 net tons in 1920, being an increase of 307,248 net tons.

Captain H. St. George Lindsay is the superintendent at Halifax.

DISTRICT OF SAINT JOHN

There are thirteen first-class pilots, two second-class pilots, and two apprentice pilots in this district. The gross earnings for 1921 were $41,946.62. The total expenses, including the upkeep of the pilot tender, was $8,071.25, leaving a balance to be divided amongst the pilots of $33,875.37. The average net earnings of each first-class pilot was therefore $1,991.40.

In this district 12 per cent of the gross earnings of the pilots is deducted for the Superannuation Fund. This fund is administered, without charge, for the Saint John Pilots by the Department of Finance.

The total number of ships piloted inward was 396 and 406 outward, of a total net tonnage of 1,896,814.

Mr. J. C. Chesley, Saint John, is the acting superintendent.

Of the forty-five other pilotage authorities constituted under the authority of the Governor in Council in pursuance of the provisions of the Canada Shipping Act, twenty-four have forwarded returns for 1921.

SIGNAL STATION, CITADEL, HALIFAX, N.S.

RECORD OF SHIPPING FROM APRIL 1, 1921, TO MARCH 31, 1922, BY F. C. KILBURN, MAJOR, R.C.E., SUPERINTENDENT OF SIGNALS

Total vessels reported	1,117
Total vessels arrived	1,115
Total vessels passed	2

ANNUAL REPORT OF SABLE ISLAND

R. Naugle, Acting Superintendent

Herewith report of work done on Sable Island under my direction from April 23, 1921, to April 29, 1922.

Building Repairs.—West light barn shingled, repairs at Main Station made; repairs at No. 2 dwelling and barn; repairs at No. 4 dwelling and barns; East light dwelling; one new pony pound built at Main Station.

Painting.—West lighthouse, Main Station men's house, No. 2 Station, No. 4 Station, East lighthouse and dwelling.

Main Station buildings lime-washed.

Garden Produce.—There was over 200 bushels potatoes, 160 bushels root crop, making a total of 360 bushels.

Cattle.—One ox killed last fall, weighing over 900 pounds; there remain 41 head of cattle, 42 trained horses, 200 wild ponies.

The present population of Sable Island now totals 44.

We shipped this year 50 barrels cranberries, 42 wild ponies and one barrel beef hides.

The *Esperanto* foundered on south side of the island May 31, 1921. The lifeboat made three trips to her, that making a total nine boat drills.

The life and surf boats are in perfect condition.

There are at present three buoys on north side of island. All were reported to the department.

REPORTS OF AGENCIES

Halifax, N.S., Agency

A contract was awarded for protection work at Sydney Southeast Bar light-station. A severe October storm carried away much of the work which was not resumed.

New range lights at Glace bay were put in operation on May 21.

The watched light at Harbour island was replaced by an unwatched lightstation.

At Liscomb island a new reinforced concrete lighthouse tower was erected, and a new boathouse and slipway built.

At Maugers beach new crib protection work was done, and old work repaired, and the foundation of the lighthouse tower was protected by ballast covered with concrete.

New roofing was put on all the flat roof buildings at Cape Race station.

Extensive repairs and improvements were carried out at Cape Freels station, including building of a new wooden dam at first pond above reservoir.

New aids to navigation during the year comprised: a spar buoy in St. Peter's bay, C.B., six spar buoys in Little Bras D'Or, C.B., four spar buoys in McKinnon's harbour, C.B., and four spar buoys at Dover, N.S.

Changes and improvements in aids to navigation were made at Sydney Harbour South East Bar, re-established to fixed red light, also mechanical fog bell; Lahave bell buoy changed from bell to gas and bell; Chebucto Head light changed from four flashes in 30 seconds to four flashes in 20 seconds; Harbour Island light, changed from occulting white kerosine oil light to occulting white acetylene gas light, unwatched.

Repairs were made to the following stations: Outique island, Beaver island, Bear island, Devil's island, Egg island, Cranberry island, Moser island, Mouse, Petit-de-Grat, Guyon island, Fort Felix, Fort Bickerton, No. East Harbour, Three Top island, Flat point, Point Tupper, Black Rock point, Gillis point, Coffin island.

The C.G.S. *Lady Laurier* during April and May, 1921, underwent repairs; on June 25 went to sea; from then on to end of March, 1922, employed in lighthouse supplies and buoy work in district.

The C.G.S. *Dollard* was employed from April, 1921, to end of December in buoy and lighthouse work; blown down for annual overhaul and repairs, January, 1922.

The C.G.S. *Stanley* employed April 1 to 16 in buoy work; April 17 to May 21, ice patrol work; June and July general agency work; August and September at agency wharf undergoing repairs; from October to December 23 laid up, and crew paid off; December 23 to March 3, 1922, icebreaking work.

The C.G.S. *W. H. Lee,* April, laying buoys; May 1 to May 10, went under repairs; May 11 to September 16, buoy work; September 16 to 26, under repairs; September 27 to January 31, 1922, general agency work; January 31, totally destroyed by fire at South Terminals.

Lightship *Halifax No. 15* during April on station; Sambro bank, to May 13; May 14 to 25, under repairs; May 26 to November 20, on station, Heath point; December 1, left for Halifax, and up to February 21 at Halifax under repairs; February 22 to March 31, 1922, on station at Sambro bank.

Pictou, N.S., Sub-agency

Buoys inner and outer were repaired, painted, and placed in position early in May, and removed in December, the work of replacing and lifting being done by ss. *Brant.*

Deep water channel from Abercrombie point to New Glasgow was bushed, and maintained by contract during season of navigation.

Steamer *Stanley* was employed in December lifting heavy outside buoys.

Three buoys (two inner and one outer) broke adrift during the season but were picked up without sustaining any material damage.

Late in December a number of vessels were caught at New Glasgow at the close of navigation, but through aid of ss. *Brant* were able to get to open water.

Steamers arrived, 300	52,079 tons	Steamers departed, 299	51,977 tons
Sailing vessels arrived, 256	15,163 "	Sailing vessels departed, 258	15,093 "

Sydney, N.S., Sub-agency

Government steamers *Lady Laurier* and *Dollard* placed and lifted Sydney harbour and Cape Breton coast buoys, and attended to the lighthouse service. Whenever possible aid was rendered to S.O.S. calls from ships on the coast.

Lighthouse keepers were appointed at Point Edward and Glace bay stations, and instructed in their duties.

Quebec buoys picked up on the Newfoundland coast were landed here and returned to the Quebec agency.

FOREIGN AND COASTWISE TRADE

Port of Sydney

Foreign inwards	283	457,516
Coastwise inwards	1,262	930,129
	1,545	1,387,645
Foreign outwards	489	664,514
Coastwise outwards	1,052	725,045
	1.541	1,389,559
Grand Total	3,086	2,777,204

PORT OF NORTH SYDNEY

Foreign inwards	909	273,864
Coastwise inwards	928	230,512
	1,837	504,376
Foreign outwards	795	286,948
Coastwise outwards	1,062	191,243
	1,857	478,191
Grand Total	3,694	982,567

ST. JOHN, N.B., AGENCY

During the year all aids to navigation were duly inspected, and repairs, cleaning, and painting at the various stations carried out.

Advocate harbour light, N.S., was changed from red light to a white light, December 12, 1921.

Chamcook light, N.B.—This light was made unwatched and replaced by an occulting white acetylene light in June, 1921.

The diaphone at Brier island fog-alarm station operated by air was changed to an oil plant in August, 1921.

The following light stations have been discontinued: Borden wharf light, N.S., and McFarlane point light, N.B.; the latter was destroyed by fire on September 13, 1921.

The following aids were established during the fiscal year:—

Kelly Cove light, N.S.—A fixed white light, shown from an anchor lens lantern, was established on Kelly Cove breakwater, June 24, 1921.

Fog bell—No. 16 Pier, West St. John, N.B.—On the outer corner of shed No. 16 a fog bell operated by electricity was established, November 25, 1921.

Life-saving service: During the fiscal year 1921-22 life-saving stations at Little Wood island, N.B., and Bayview, N.S., were inspected from time to time.

The lifeboats were overhauled and repaired, and were used in delivering supplies to some of the isolated stations.

Repairs were made to wharves at Amherst point, Church point, Comeau cove, Dipper harbour, Edgett's landing, Meteghan river, and West St. John. Total wharfage collections amounted to $58,128.17.

At the Partridge Island signal station, St. John, 61 steamers, tonnage 161,296, were signalled, and 11 sailing ships, tonnage 4,102; total 72 ships, tonnage 165,498.

Construction work: Gannet Rock light.—Three new piers were placed under the lower end of the tramway.

Point Lepreau.—A new lightkeeper's dwelling was built at a cost of $5,975.

Machias, Seal island.—An oil storage tank was installed for fuel oil.

Cape Sharp light.—An oil storage tank was installed.

C.G.S. *Aberdeen* on April 15, 1921, went to the assistance of ss. *Impoco,* stranded on Blonde rock, and tried to tow her off, but failed. From June 21 to July 26, was in Lewis Slip, St. John, undergoing repairs. On August 13, went to the assistance of schooner *Edith McIntyre,* stranded on Tiner point, made hawser fast, and endeavoured to tow her off, but failed; from then to October 14, employed in agency work; from October 15 to December 18, at Halifax and St. John undergoing repairs; from latter date to end of fiscal year employed in ice-breaking and buoy service.

C.G.S. *Laurentian* was employed in general agency work throughout the season, save for the periods May 17 to June 3 and November 7 to 11, when she underwent repairs.

Charlottetown, P.E.I., Agency

A new Aga light system was installed at Amet island, N.S., doing away with the necessity for a lightkeeper.

During the past season four new apparatus, 35 mm. Diamond, were installed at Margaree island, N.B., Etang du Nord, and Amherst island (Magdalen islands), and St. Mary island (Labrador), all of which are giving entire satisfaction.

The C.G.S. *Brant* was employed in district work from July 1 to August 6.

The C.G.S. *Aranmore* was engaged in work in the district from October 7 to December 10; on December 8 went to the assistance of the steamer *Bethlehem.*

Quebec Agency

A new fog-alarm plant was established at Father point.

A new tower and lantern was erected at Paspebiac.

Range lights were established at Pentecote river.

Oil storage tanks were installed at Charleton point and Table head.

Repairs were made to a number of wharves, and at various stations.

Five new wharves were transferred to the agency during the year, viz: Shigawake, Peribonka, Ile Verte, St. Valier, and Seven islands; there are now sixty-eight wharves under agency control. The total collections for the year amounted to $11,320.30.

A new steel lightship, self-propelled by steam, was placed on Lower Traverse station.

A new automatic acetylene gas buoy, white light, occulting, was placed to mark wreck of ss. *Canadian Recruit,* near St. Jean Port Joli.

Three wooden spar buoys were placed to indicate channel near Port Alfred wharf.

Two pole lights were erected to serve as range leading to entrance of Pentecote river.

At Grosse Roche light.—Oil lamp was replaced by Aga gas type lantern. Pointe Noire light was changed from catoptric to dioptric, visible from all points of approach.

The C.G.S. *Eureka* was employed throughout the season of navigation in the work of embarking and disembarking pilots at Father Point.

Other Dominion steamers employed in the agency at various periods during the season were the *Rouville, Druid, Montcalm,* and *Aranmore.*

Montreal Agency

Due to rigid economy exercised in all branches, the expenditure in the district was $136,911.67 less than that of last year.

No new construction work was carried out in the district during the year. Necessary repairs were carried out in connection with existing lightstations and beacons.

Dominion steamers *Argenteuil, Lavaltrie, Reserve, Shamrock,* and *Vercheres* were employed in the district at various periods during the season.

Victoria, B.C., Agency

Little new construction work of any importance was carried out during the year. The existing range lights in the Fraser river were rearranged, owing to the change in the channel. A powerful quick-flashing apparatus was installed at Entrance island lightstation. Several minor installations were made, and necessary repairs carried out in connection with wharves, lights, and beacons.

The life-saving stations at Bamfield, and Clayoquot were efficiently manned, and although no serious wrecks occurred during the year assistance was rendered at various times to fishing boats and small vessels in distress.

An acetylene unwatched Aga light was established at Dog island, and an acetylene Aga beacon light at Ildstad island.

Necessary repairs were made to various lightstations and wharves.

C.G.S. *Estevan* was employed in agency work from April 1 to June 5; June 6 to June 16 under repairs; June 17 to November 16 employed in district; November 17 to 24 under repairs; November 25 to December 23 engaged in agency work; December 24 to January 3 under repairs; from then to March 25, when she was blown down for annual inspection and overhaul, employed in agency work.

C.G.S. *Newington* employed in district from June 25 to July 26.

C.G.S. *Berens* employed from May 19 to March 30 in agency work, save for the periods of November 24 to December 1, and December 26 to January 1, when she underwent repairs.

Prince Rupert, B.C., Agency

The launch *Rhona* was engaged throughout the year, transferring mail, passengers, and supplies between the depot and the city, and giving a regular service to the wireless station and quarantine hospital.

At Triple island lightstation a new aerial tramway was installed, and a new boathouse and engine house built.

A new occulting acetylene beacon was erected on Kingui island, Cumshewa Inlet.

Day beacons at Inverness Cannery and White point blown down by storms, were rebuilt.

The six Government wharves in the district, at Stewart, Alice arm, Spiller river, Refuge bay, Massett, and Queen Charlotte city were kept in good repair.

C.G.S. *Estevan* was employed in the district throughout the season, except during the month of July when she was transferred to the Victoria district.

C.G.S. *Birnie*, a new oil burning vessel, arrived at the depot on May 20, and for the balance of the season to the end of March was continuously employed in the lighthouse supply and buoy services.

Fort William, Ont., Sub-agency

Icebreaking was carried on as usual in the district. First vessel arrived from east on April 7. Oil light at Kaministiquia entrance channel was replaced by an electric light. An unwatched light was installed at Pie island, and operated on May 16.

All shore lights were put in operation on April 14. Thirty-six spar buoys were placed in Port Arthur and Fort William harbours and maintained during the season.

Navigation closed on December 12. On November 30 Shaganash lighthouse was burned down.

C.G.S. *Bayfield*, after wintering at Port Arthur, left for down the lake on June 2.

C.G.S. *Grenville* arrived at Fort William on July 27, and after supplying the local lightstations left for the east July 31.

Kenora, Ont., Sub-agency

All lightkeepers went to their stations on May 16-17, the last returned on November 11. The existing buoy service was maintained throughout the season.

The launch *Wolf* was employed on buoy service on Shoal lake, steamer *Laura A* on Rainy river and lake, and the steamer *Sport* on Winnipeg river.

A floating island obstruction in Shoal Lake channel was successfully removed.

Dominion Lighthouse Depot, Prescott, Ont.

During the year necessary work in connection with the proper maintenance of lights, beacons, gas and other buoys, was performed in the Prescott division. Repairs were made to the Government steamers *Concretia* and *Scout,* and the proper upkeep of the depot maintained.

About 211 orders were completed by the machine shop during the year, including the making of vapour supply parts, diaphone parts, and other material for stock, the remodelling of Reliance clocks, repairing and remodelling of materials received from the agencies, repairing of reflectors, lenses and other forms of apparatus for shipment. A considerable amount of work was done on orders not yet completed.

The carpenter shop kept all buildings of the Dominion Lighthouse Depot in good repair, made necessary repairs to decks and hulls of Government steamers of the Prescott division, handles for various tools, buoy superstructures, etc.

The paint shop department attended to the painting of buildings, government steamers, buoys, towers, and lighthouse apparatus.

The coppersmith and tinsmith shops did all work connected with apparatus and materials prepared by the machine shop, made repairs to chance anchor lanterns received from various agencies, and did all tinsmith and coppersmith work in connection with repairs to Government steamers and to the plant of the Depot.

The brass foundry made castings for superstructures, Reliance clocks, anchor lanterns, mercurial clock pedestals, and other forms of apparatus. Castings were also made for vapour supplies, fog alarm parts, and buoy lantern parts, and for the depot plant and Government steamers.

Packing and shipping department sent out 488 shipments during the year. Second hand materials received were unpacked, examined, and prepared for valuation.

The blacksmith shop prepared forgings for various kinds of lighthouse apparatus, made up at the depot, did all blacksmith repair work necessary, and made a number of articles for various agencies, such as buoy chains, shackles, buoy rings, foundation bolts, angle pieces, spanners, etc.

The shipyard shop attended to the loading and unloading of railway cars, and the carrying of freight to and from the depot, kept the depot yards in proper condition, and furnished labour for the various shops as required. A number of concrete anchors were made, and twenty-five spar buoys were made and forty repaired.

The gas test room repaired, painted, and tested all buoy and lighthouse lanterns belonging to the division, and overhauled lanterns received from the agencies. Shipments of Pintsch gas received were measured up and reported on. A number of carbide door gaskets, purifier door gaskets, flash burner gaskets, and buoy lantern diaphragms were made for the various agencies and for stock.

The pattern shop turned out eight new patterns, and overhauled and stored those already made. Pattern records were kept.

The drawing shop, besides supervising the pattern shop, made sixteen drawings during the year, sketches were also made for use in the machine, blacksmith and pattern shops.

The C.G.S. *Concretia* went into commission on April 9, and was laid up on December 20.

The C.G.S. *Scout* went into commission on April 7, and was laid up on December 10.

Parry Sound, Ont., Agency

At the closing of navigation and during the winter months, 1922, all the gas buoy lanterns from Sarnia to the head of lake Superior were overhauled and tested; a total of fifty-seven lanterns in all, and all gas and iron buoys in Georgian bay and lake Huron were also overhauled.

Repairs were effected to a number of light stations in Georgian bay and north channel of lake Huron.

The C.G.S. *Grenville* was employed in the district from April 11 to December 24, and the C.G.S. *Lambton* from April 1 to December 16.

PORT WARDEN'S REPORTS FOR THE YEAR ENDED DECEMBER 31, 1921

Reports have been received from thirteen port wardens: seven from Nova Scotia port wardens; two from Quebec port wardens; and four from British Columbia port wardens.

The total amount of fees collected at the port of Montreal amounted to $12,205.93, at the port of Halifax $3,022, at the port of Sydney. C.B., $1,568, and at the port of Quebec $1,443.50.

At the port of Montreal the channel to Quebec was clear on March 29, twenty-one days earlier than last year, on this date the C.G.S. *Lady Grey* arrived at Montreal from Quebec.

The first overseas ship the *Venusia* arrived from London with general cargo on April 21. The first departure overseas was the *Cabotia* for Glasgow with general cargo on May 1.

Navigation closed on December 8 with the departure of the tank steamer *G. R. Crowe* for New York.

The number of overseas ships reported at Montreal during the season was 781, tonnage 2,571,695; an increase of 235 vessels and 675 256 tons over last year's record.

For the lower ports 186 vessels cleared, tonnage 354,385; an increase of 145 vessels and 331,602 tons over last year's record, due largely to the resumption of the coal trade with the lower ports.

There has been a marked increase in the export of cement from the port during the season, chiefly for Cuban ports and Porto Rico.

Shipping of live stock has also been resumed during the season, 30 517 head of cattle, 2,068 sheep, and 76 horses, and 40 ponies were shipped overseas.

The water in the ship channel between Montreal and Quebec was unusually low during the months of August and September.

Only minor casualties occurred in the Montreal-Quebec ship channel during the season as follows:—

June 1.—SS. *Canadian Seigneur* grounded off Longueuil; no damage, reloaded cargo, and proceeded on her voyage.

June 16.—SS. *Wathena,* of Philadelphia, grounded off Imperial Oil Co's. Works; no damage, reloaded cargo, and proceeded on her voyage.

July 13.—SS. *Rygja* from Montreal, grain laden and steam barge *Mapledawn* collided off St. Croix; both damaged.

Sept. 12.—SS. *Bellerby* stranded off Ile Ronde (St. Helen's island) refloated; no apparent damage, proceeded on her voyage.

REPORTS OF HARBOUR COMMISSIONERS

Quebec Harbour Commission

CHIEF ENGINEER'S REPORT

The only new work in connection with the extension of the harbour facilities consisted in the laying down of a third railway line for a length of 1,240 feet along the south face of landing shed No. 29, to accommodate the grain cars handled at the commissioners elevator No. 2.

Repair and maintenance were carried out as follows:—

Reconstruction of one of the Gantry grain loaders, damaged during a windstorm. Repair of the tidal harbour face of the breakwater, damaged by a colliding vessel. Repair of the river face of Wellington wharf, damaged by a steamer. Repair to cross-wall Bascule Railway bridge, damaged by a vessel entering the wet dock. Repair to the pontoon of the 50-ton crane. Two new passenger gangways were constructed, and roofs of sheds No. 22 and No. 7 were painted. Quays and front of sheds Nos. 19 and 21 were filled in with stone from excavation for building foundations.

WHARFINGER'S REPORT

The traffic in connection with the St. Charles river docks and wharves was: Ocean-going inwards, 384 vessels, 1,118,024 tons registered; outwards, 108 vessels, 355,136 tons registered; lower port steamers, inwards, 56, 17,331 tons registered; outwards, 67, 19,301 tons registered; Montreal to Quebec (Kirkwood ss. lines) inwards, 45 vessels, 7,592 tons registered; outwards, 44 vessels, 6,930 tons registered.

The docks were occupied during the winter months by a large number of vessels of various tonnages until the opening of navigation.

HARBOUR-MASTER'S REPORT

Navigation opened on March 22, 1921, when the C. G. S. *Lady Grey* left for Three Rivers; on April 7, the first coasting steamer *R. P. Labrosse* arrived from Tadoussac, and on April 23, the first overseas vessel the *Cabotia* from Glasgow.

Navigation closed on December 15, when the *Montcalm* arrived from Saguenay to take up winter quarters.

TRAFFIC MANAGER'S REPORT

Loaded cars received	8,371	
Loaded cars forwarded	6,861	
		15,232
Empty cars received	5,777	
Empty cars forwarded	7,395	
		13,172
Total number of cars handled		28,404
Total number of cars interchanged via harbour tracks		551
Loaded passenger, mail and baggage cars handled		1,788
Total number of cars coal handled		3,016

GRAIN ELEVATOR NO. 2

Grain received—		
In store at end of season 1920		145,270 bushels
Wheat	1,265,967 bushels	
Corn	3,171,966 "	
Oats	938,761 "	
Other grain	234,550 "	
		5,611,244 bushels
Total		5,756,514 bushels
Grain delivered—		
By conveyors	4,223,560 bushels	
" cars	158,639 "	
" bags	1,165,892 "	
		5,548,091 bushels
In store January, 1922		208,423 bushels

The above figures are the total handling for 1921. Among these figures local handling amounted to 1,332,242 bushels, of which 340,066 bushels were recleaned.

REVENUE AND EXPENDITURE

The revenue in 1921 was $387,323.91; the expenditure, $335,303.17, leaving a surplus for the year of $52,020.74.

GENERAL

During the year under review the strictest economy was observed in the administration of the port, as shown by the 1921 surplus of $52,020.74, as against a deficit of $65,221.96 for the year 1920, an improvement of $117,242.70.

Although there was a decrease of 76 vessels inwards and 106 outwards in 1921 as compared with 1920, the quantity of freight handled in 1921 exceeded considerably that handled, in 1920, owing to the larger number of vessels loading and unloading full cargoes in 1921, as against part cargoes in 1920.

Vancouver Harbour Commission

BALLANTYNE PIER

The extra accommodation which this pier will afford is urgently needed.

The pier is situated between the Great Northern pier and the Hastings saw-mill, and when completed will be 1,200 feet long by 341 feet wide and will consist of a central gravel fill with a concrete deck, carried on reinforced concrete cylinders on either side. There will be upon it four two-story transit sheds, 110 feet wide each, two car tracks on each side between the edge of the pier and the front of the sheds, and three tracks and a roadway in the centre of the pier between the sheds.

It is estimated that this pier will be completed with superstructure by midsummer 1923.

TERMINAL RAILWAY FACILITIES

The Board of Railway Commissioners of Canada have authorized a terminal system which will connect Ballantyne pier and the present Government wharf with the Great Northern Railway interchange on Burrard inlet, and from that point to the terminal of the Canadian National Railway at False creek.

This system will directly connect the Government wharf and Ballantyne pier with all the railway systems entering Vancouver, and provide adequate switching facilities to and from the piers.

Another part of this system which will be carried out as soon as conditions permit, will be a cross-channel car-ferry, with its south shore terminal at Ballantyne pier. This will enable the various railway companies to extend their services to North Vancouver, and make available to the city and district of North Vancouver the facilities of Ballantyne pier.

IMPROVEMENTS TO NAVIGATION

In the interests of shipping, it has been decided providing the consent of the department is obtained, to take over the signalling station at Prospect point, at the entrance to the harbour, and to install a complete signalling system, which will be continuously operated day and night, and directly connected by phone with the harbour-master's department.

It is also proposed to establish a beacon light and fog signal on the north side of the First Narrows.

The nuisance of floating logs and snags in the harbour is being dealt with by a new powerful work boat the *Atkinson,* which was completed in November, and employed in removing these obstructions to navigation with great success.

Leading marks fitted with elecrtic lights, so as to serve both by day and night, are being installed in Coal harbour for the use of small commercial craft and pleasure yachts navigating this section of the harbour.

HARBOUR POLICE

A beginning has been made in the establishment of a harbour police force by the appointment of two constables, who patrol the water front night and day.

The officers enforce the Commissioners' By-laws, in regard to requirements for prevention of accidents, fire, explosions, and pollution of the waters of the harbour by oil, débris, or offal. The results of their work so far have been eminently satisfactory.

MINOR WORKS AND MAINTENANCE

Government wharf.—Resurfacing has been carried on. A new private spur track 600 feet in length was built from No. 3 track to serve the Hastings Shingle Manufacturing Company.

Granville Island.—A private spur 500 feet in length was built on lot 7 to serve the works of the Northern Realty Company. Road repair work was carried out, and underdrainage provided at several points where needed.

High water boundary surveys.—A series of water front bench marks have been established showing the high water boundary of all properties within the harbour. This has been done on the south side of Burrard inlet from Coal harbour to Second Narrows, and around False creek. The levels will be completed on the north shore of the Central harbour, and the boundaries then defined.

Soundings.—Soundings of the various berths in Burrard inlet were completed, and additional soundings made in False creek, between Granville island and Connaught bridge.

Booming grounds.—Seymour booming ground was put in operation during the year.

Public landing stage.—A float 80 feet by 15 feet was built and placed in front of the Dominion immigration shed for the use of the public in making landings by tender from larger ships at anchor in the harbour. Provision was made in rear of float to moor the commissioners' tug *Atkinson,* and small inspection launch.

RECORD OF SHIPPING FOR YEAR ENDED DECEMBER 31, 1921

Coastwise

Number of vessels (local)	11,095
Number of vessels (foreign)	390
Total gross tonnage	7,257,382
Total net tonnage	4,374,262
Number of passengers landed	342,151
Number of passengers shipped	339,602

Deep Sea

Number of vessels	389
Total gross tonnage	2,659,366
Total net tonnage	1,678,874
Number of passengers landed	16,199
Number of passengers shipped	16,036

Operating Revenue

Harbour dues—Port warden fees, etc	$104,497 20
Cargo rates	142,442 96
Government wharf—rental	43,750 00
Granville island—rental revenue	34,506 15
Rental of water lots	15,741 57
	$340,937 88

OPERATING EXPENDITURE

Government wharf—Maintenance and repairs	$ 5,428 16
Granville island—Operating expenses and maintenance	8,414 05
Interest and exchange on debentures issued in connection with Granville Island Development work	50,409 78
Sundry expenses on harbour, etc.	5,161 59
Administration and Miscellaneous expenses	95,950 33
Total operating expenditure	$165,363 91
Surplus for year ended December 31, 1921	175,573 97
	$340,937 88

MONTREAL HARBOUR COMMISSION

ACCOMMODATION

The present accommodation and facilities of Montreal harbour are practically as given in last year's report. The new large warehouse and cold storage plant, close to the Canadian Pacific city terminals on the harbour front, alluded to in last year's report, is now nearly completed, and when in use will afford additional facilities.

The total expenditure on Montreal harbour at the close of the season of 1922 amounted to $33,000,000.

WAREHOUSE AND COLD STORAGE PLANT

This plant is now nearing completion; it is 440 feet long by 110 feet, situated at the foot of Beaudry street, on the harbour front, within one-quarter of a mile of Bonsecours market. Any ocean liner can berth at the dock. Ten refrigerator cars can be switched into the house adjoining the trucking platform, and ten others may be loaded or unloaded from a track just outside the warehouse. Motor-trucks or teams to the number of thirty can handle goods directly at the trucking platform.

There are four large freight elevators and one passenger elevator, and four mechanical platform conveyers with gravity or belt connections to and from ships are being designed.

Commodious offices and four large stores will be placed on the main distribution floor.

Each of the cold storage floors is provided with a main corridor 280 feet by 20 feet, where weighing, sampling, inspection, etc., may be carried on.

Storage is provided as follows:—

1. *Cellars.*—There are nineteen massive reinforced concrete cellars, 90 feet by 20 feet and 5 feet to 6 feet high; total storage capacity, 100,000 cubic feet.

2. *Basement.*—420 feet by 90 feet by 15 feet; total shortage capacity, 350,000 cubic feet, teams and motor-trucks, 50,000 cubic feet; trucking platform, 75,000 cubic feet.

3. *Distribution Floor.*—440 feet long, with railway tracks for ten cars, and facilities for 30 motor-trucks under cover, also general offices and four stores. Capacity, railway cars, 150,000 cubic feet; teams and motor-trucks, 150,000 cubic feet; offices, stores and distribution, 300,000 cubic feet.

4. *Second, Third, and Eighth Floors.*—440 feet by 110 feet for dry storage; total storage capacity, 1,500,000 cubic feet.

5. *Fourth Cold Storage High Temperature Floor.*—Nine compartments connected with main corridor, temperatures 30° to 34°F., suitable for eggs, cheese and fruit; storage capacity, 375,000 feet.

6. *Fifth Cold Storage Floor.*—Nine compartments connected with main corridor, temperature 25°F., suitable for general merchandise; total storage capacity, 375,000 cubic feet.

7. *Sixth Cold Storage Floor.*—Nine compartments connected with main corridor, temperatures 10° to 14° F., suitable for butter, fish and poultry; total storage capacity, 375,000 cubic feet.

8. *Seventh Cold Storage Floor.*—Nine compartments connected with main corridor, temperatures 5° to 15° F., suitable for meats; total storage capacity, 440,000 cubic feet.

Totals—

Total natural cool storage	450,000	cu. ft.
Total dry storage	1,500,000	"
Total space for railway cars and vehicles	350,000	"
Total space for corridors, elevators, etc	388,000	"
Total space for distribution, offices and stores	375,000	"
Total space for cold storage	1,565,000	"
Grand total	4,628,000	"

The warehouse is built of massive reinforced concrete, with brick curtain walls, and every known modern appliance for convenience and efficiency has been provided.

On the top of the building are four water towers: three for a sprinkler system and one for general purposes.

An artesian well 1,100 feet deep, furnishing water of excellent quality at a summer temperature of 42° F., is one of the features of the plant; a small icemaking machine is another feature.

The power-house and mechanical equipment is 50 feet distant from the warehouse, and is a separate massive reinforced concrete and brick building with three fire-walls.

All important machinery, compressors, etc., are in duplicate.

NEW STEEL TRANSIT SHEDS NOS. 18 AND 19

The Victoria pier is in the form of an "L," the upper part of the "L" abutting on the shore, the lower part roughly parallel to it; the shore and the two sides of the pier enclosing a sheltered basin (Market basin). Sheds Nos. 18 and 19 are built on the lower part of the "L".

They are built of steel throughout, rolled shapes, combined length on berthing side 1,070 feet, with lower and upper floors.

The floor and roof slabs are of reinforced concrete with carrying capacity apart from their weight of 600 pounds per square foot for floor and 120 pounds per square foot for roof.

The roof of the sheds has been designed to serve as a public recreation platform, on which light structures in the form of restaurants or amusement buildings could be erected.

The sheds are supplied with a grain conveyer gallery with two shipping belts, similar to those over the other sheds only at a higher level.

Accommodation etc.—	Shed 18	Shed 19
Lower floor area	37,100 sq. ft.	39,700 sq. ft.
Upper floor area	40,700 "	43,100 "
Roof floor area (to be used as promenade deck)		85,100 "

These sheds were formally opened by the Honourable C. C. Ballantyne, the then Minister of Marine, on May 5, 1921.

ENGINEERING DEPARTMENT

(Items of construction completed 1913-1921).

New Victoria Pier and Market Basin.—Since 1913, 2,454 linear feet of new berthage have been completed.

Extension of Shore Wharves, Sections 24-35.—Up to date approximately 3,000 linear feet have been completed; in addition to these extensions, improvements include completion of basin for floating dock at Maisonneuve, construction of wharf at Pointe aux Trembles for the Canada Cement Company, construction of wharf at Montreal East for Imperial Oil Company, Limited, construction of wharf for municipality of Montreal East, extension and partial reconstruction of Jacques Cartier pier, reconstruction wharf sections, 23-24.

Railway Extensions.—From 36 miles in 1912 the harbour railway system has increased to 59 miles to-day. Principal items of improvements and extensions were: Doubling and raising main lines above flood level from Molson's creek to Racine pier; extension of high-level railway from Racine pier to Montreal East, a distance of four miles, with yards and connections to industrial plants; storage and transfer yard at Maisonneuve, storage yard at sections 41-43, switching and city delivery yard at Moreau street, widening high-level railway at sections 27-30 from two to five tracks, extension of harbour tracks on Commissioners street, enlargement of railway entrance at section 12, railway connections to all new wharves and piers, numerous industrial sidings.

Dredging and Filling.—The following improvements have been carried out since 1913:—

Deepening of south side of Windmill Point basin.
Widening and deepening of channel in central harbour.
Removal of shoal between St. Helen's island and Guard pier.
Widening of channel opposite St. Helen's island and Ile Ronde.
Extension of South Shore channel.
Widening of channel from section 46 to section 56.
Widening of entrance channel to floating dock basin.
Approach channel to Imperial Oil wharf, Pointe aux Trembles.
Channel approach and site for Bickerdike pier extensions.

New Concrete Road, St. Lambert-Longueuil.—The new road of reinforced concrete, 24 feet in width and 3,644 feet long, was formed along the eastern boundary of the property, and deep rubble and tile drains were laid along the entire length, on both sides of the road, while ditches and field drains were carried along the roadway by concrete culverts.

Buildings.—East addition to elevator No. 1, completed in 1914, giving additional capacity of 1,500,000 bushels. West addition to elevator No. 1, completed May, 1916, giving additional capacity of 1,500,000 bushels.

Locomotive Shop, Section 42, reinforced concrete construction, completed in 1919, 130 feet by 42 feet.

Cold Storage Warehouse and Power-house (foot of Beaudry street).—It is expected that this structure, already described, will be ready for operation by the opening of navigation in 1922.

GRAIN ELEVATOR SYSTEM

During the season the system handled 102,671,716 bushels, and the Grand Trunk elevator "B," 35,726,771 bushels, a total of 138,398,487 bushels, an increase of 121 per cent over 1920.

During the whole season the system was working to capacity, and in September the rush was such that business had to be refused and diverted elsewhere.

This record would not have been possible without the co-operation of the grain merchants, steamship companies, railway companies, forwarding companies, and the excellent labour conditions of the port.

Elevator No. 1, capacity 4,000,000 bushels.—Date first vessel unloaded, April 26, 1921. Date last vessel unloaded, November 26, 1921. Total receipts, 47,788,365 bushels. By water, 32,135,347 bushels, taken from 446 steamers and 88 barges, or 534 vessels. By cars, 15,653,018 bushels, unloaded from 8,254 cars.

Elevator No. 2, capacity 2,662,000 bushels.—Date first vessel unloaded, April 27th, 1921. Date last vessel unloaded, December 10th, 1921. Total receipts, 53,203,729 bushels. By water, 18,623,729 bushels, taken from 305 steamers and 105 barges, or 410 vessels. By cars, 34,580,060 bushels, unloaded from 17,033 cars.

ELECTRIFICATION OF STEAM OPERATED HARBOUR RAILWAY TERMINALS

The Montreal harbour railway terminals consist of surface lines between Victoria bridge and the Imperial Oil Company wharf, with a total trackage of 58·54 miles.

Electrification for freight-yards and terminals has been found economical and satisfactory, electric locomotives being considerably more efficient than steam locomotives, especially during the winter months.

The harbour terminals have been electrified from section 35 to section 101, a distance of about seven miles; an additional 1·5 mile is partly completed, which when finished, will link up to the large sorting yard at section 20 and the Power-house, and complete the first part for complete electrification.

POLICE DEPARTMENT

Organized in 1913 the harbour police force during the summer season of 1921 comprised one chief, three captains, and fifty-five constables, uniformed and armed, who regulate the traffic on the wharves, maintain order, and protect life and property within the harbour limits.

Thirty-two of the constables were continually at the disposal of the various shipping companies during the summer for special service in protecting cargoes.

During the winter season the force consists of four officers and twenty constables.

During the season of 1921, 95 passenger ships docked, bringing 19,677 passengers, and the same number of ships sailed with 41,913 passengers, making a total of 61,590 passengers handled without accident.

During the season 150 persons were arrested for various offences and brought before magistrates.

FINANCIAL STATEMENT

Receipts on revenue account were $2,891,274.42, an increase of $456,500.70 over last year, due largely to receipts from the grain elevator system.

The cost of operation, maintenance, sinking fund, etc., was $2,724,100.02, an increase of $327,791.92 over last year, leaving a surplus to the credit of revenue account for the year of $167,174.40.

SHIPPING—PORT OF MONTREAL

STATEMENT showing the nationalities and tonnage of sea-going vessels that arrived in port, during the season of 1921, that were navigated by 60,837 seamen.

Nationality	Number of Vessels.	Tonnage.
British	745	2,294 846
American	48	164,814
Italian	27	87,175
Norwegian	84	206,153
French	12	39,887
Greek	2	5,249
Dutch	24	55,914
Spanish	1	2,563
Danish	10	17,776
Finnish	1	2,437
Icelandic	1	428
Swedish	7	10,101
Jugo Slav	2	4,613
	964	2,891,956

GENERAL

During the year a number of records for the port of Montreal were smashed, the greatest number of ships in port in any one day, the greatest number of ocean vessels in any year, the greatest tonnage in any year, and the greatest grain handling record, doubling any past ones.

At various periods distinguished visitors inspected the harbour, including Hon. C. C. Ballantyne, the Minister of Marine, and members and senators, the Consulting Engineer of Milwaukee harbour, and the Chief Engineer of Gothenburg harbour, Sweden, and during the season the harbour and the new cold storage plant were inspected by members of the Chamber of Commerce, the Board of Trade, and members of the Montreal Produce Merchants' Association.

No serious accidents or marine casualties occurred either in the port of Montreal, or the river St. Lawrence ship channel during the year.

THREE RIVERS HARBOUR COMMISSION

STATEMENT of Number and Tonnage of Steamers and Other Vessels Reported Inward and Outward of the Port of Three Rivers, for the Year 1921

Ocean Traffic — Nationality	Return of Vessels Inward		Ocean Traffic — Cleared for	Return of Vessels Outward	
	No.	Tons		No.	Tons
British	9	22,679	Inland ports	10	23,922
American	2	4,846	Great Britain	1	3,172
Dutch	2	5,971	South America	3	7,604
Danish	1	1,202			
	14	34,698		14	34,698
United States Traffic			**Inland Traffic**		
Canal boats	79	7,993	Tugs, steamboats, barges	648	804,270

RECAPITULATION

Ocean traffic	14	34,698
United States traffic	79	7,993
Inland traffic	648	804,270
Grand total	741	846,961

MERCHANDISE

Inward		Outward	
Hard coal..tons	12,802	Sand..tons	55,500
Soft coal.."	64,851	Hay.."	215
Sand.."	560	Wood-pulp.."	417
Coke.."	300	Laths..pcs.	45,700
Hay.."	15	Lumber..feet	6,988,310
Sulphur.."	6,071		
Gravel.."	8,120		
Marsh hay.."	269		
Pig-iron.."	378		
Machineries.."	550		
Fuel oil..imp. gals.	4,790,200		
Bricks..	1,285,000		
Apples..bushels	2,025		
Lumber..feet	60,000		
Timber.."	1,342,645		
Shingles..	15,000		
Laths..pcs.	860,000		
Cordwood..cords	1,080		

RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1921

Tonnage dues..	$ 1,373 49	Current expenses..	$ 314 35
Moorage dues..	645 16	Salaries and commissions..	5,661 82
Harbour dues: Inward..	9,315 28	Printing and stationery..	64 64
Harbour dues: Outward..	1,789 89	Travelling..	68 45
Rent of wharves..	4,953 55	Repair and general harbour expenses..	1,909 22
Commutation..	1,543 50	Interest on debentures..	9,487 50
Similar amounts to be collected.	1,390 50		
Total receipts..	$21,011 37	Total expenses on revenue..	$17,505 98
Divers and discounts..	15,163 82	Divers and repayments..	6,044 80
Interest on deposit, reserve account..	70	Construction account..	12,874 05
		Outstanding account..	1,390 50
Deposit in bank and cash on hand, December 31, 1920..	3,621 02	Deposit in bank and cash on hand, December 31, 1921..	1,981 58
	$39,796 91		$39,796 91

REPORT OF THE QUEBEC SALVAGE AND WRECKING COMPANY, LIMITED

Salvage Operations for the Fiscal Year Ended March 31, 1922.

1921—

May 14 to 17.—British steamer *Keyingham* struck Princess shoal, came off, anchored Tadoussac; we assisted her to Quebec.

July 18.—Norwegian steamer *Rygja*. Diving examination of bottom while lying afloat in the harbour of Quebec.

August 2 to 4.—Norwegian steamer *Otto Sverdrup*. Became disabled owing to breakdown of machinery off Stone Pillars; the ss. *Lord Strathcona* towed her from Stone Pillars to Montreal.

August 7 to 8.—C.G.M.M. *Canadian Challenger*. SS. *Lord Strathcona* towed her from Quebec to Three Rivers for installation of machinery.

October 5 to 16—Norwegian steamer *Karen Roegenaes.* This steamer stranded off Bonne Esperance. Went with full equipment to render her assistance but upon arrival found that the ship had sustained damage to such an extent that she was beyond salvage and was condemned.

October 18 to 20.—H.M.S. *Wistaria.* Struck on Red Island reef, came off, anchored off Hare island with various compartments full of water, went to her assistance and by use of our pumps she was kept afloat and towed by our ss. *Lord Strathcona* to Quebec where we further attended her until she was placed in dry dock.

October 25.—British steamer *Maindy Hill.* Diving examination of bottom while lying afloat in Louise basin, Quebec.

November 19 to 22.—British steamer *Gyp.* Grounded Saguenay river, went to her assistance; steamer came off and went to Quebec.

November 25.—British steamer *Wabana.* Diver's services in connection with closing tank injection, while steamer was lying afloat at shed 19, Louise basin, Quebec.

December 14.—Norwegian steamer *Brant County.* This steamer struck North channel, came off and returned Quebec. Our diver examined bottom and we assisted in doing necessary repairs on tank top and hold and placing pumps which enabled steamer to proceed to Halifax, to which port our pumps and men assisted her.

The ss. *Lord Strathcona* and schooner *G.T.D.* properly manned with all salvage gear, in good order, have been kept in commission during the season of navigation to proceed to any accidents or mishaps to ships at very short notice.

REPORT OF PACIFIC SALVAGE COMPANY, LIMITED

Salvage Operations for the Year Ended March 31. 1922.

1921—

July 31 to August 3.—SS. *Canadian Exporter* on Willapa bar, off the Oregon coast.

August 25 to September 13.—SS. *Canadian Importer* in distress 600 miles south of Columbia river.

October 4 to 6.—SS. *Arizonan* in sinking condition in Esquimalt harbour after grounding at San Juan Island.

December 1 to 3.—Barquentine *Simon F. Tolmie* in straits of Juan de Fuca with steering gear broken.

December 18 to 30.—Canadian Pacific Railway transfer barge *No. 8,* ashore at Porlier pass, B.C.

1922—

March 16 to 24.—Tug *Des Brisay* submerged off Gonzales point near Trial island.

RETURNS OF SHIPPING MASTERS FOR THE YEAR ENDING DECEMBER 31, 1921

NOTE.—The Collector of Customs acts as shipping master where no shipping master is appointed.

QUEBEC

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen Discharged	Amount
Chandler	Gaspé				
Escoumains	Saguenay				
Gaspé	Gaspé				
Grand Pabos	Gaspé				
*Montreal	Hochelaga	I. O. Grey	8,234	7,243	7,557 90
Magdalen Islands	Gaspé	C. F. Painchaud	Nil	Nil	Nil
Paspebiac	Bonaventure	E. W. LeGallais	Nil	Nil	Nil
Perce	Gaspé	Phil. LaBoutellier	Nil	Nil	Nil
Quebec	Quebec	T. Beland	835	684	622 15
Rimouski	Rimouski				
St. Johns	St. Johns				
Three Rivers	St. Maurice	W. D. Fisher	16	18	13 40
			9,085	7,945	8,193 45

*Shipping masters certificates, etc., $1,268.80.

NEW BRUNSWICK

Albert	Albert				
Alma	Albert				
Baie Verte	Westmoreland				
Bathurst	Gloucester	C. J. Melanson	1	5	2 00
Chatham	Northumberland	R. J. Walls	5	7	4 60
Dalhousie	Restigouche				
Dorchester	Westmoreland				
Fredericton	Westmoreland				
Grand Harbour	Charlotte				
Harvey	Albert				
Hillsborough	Albert				
Lepreau	Charlotte	J. E. Haggerty	Nil	Nil	Nil
Musquash	St. John				
New Brandon	Gloucester				
Newcastle	Northumberland				
Quaco	St. John				
Riverside	Albert				
Rockport	Westmoreland				
Sackville	Westmoreland				
St. Andrews	Charlotte				
St. George	Charlotte	I. Cameron	6	7	5 10
St. John	St. John	W. H. Purdy	1,732	1,728	1,384 40
St. Martins (or Quaco)	St. John	R. Allan Love	20	12	13 60
†St. Stephen	Charlotte	Andrew McWha	Nil	Nil	Nil
Shediac	Westmoreland				
Shippigan	Gloucester				
			1,764	1,759	1,457 70

†Schooner *Moonlight*, New York, coal, $1.50. Schooner *Edward Smith*, $3. 72 lighters and sardine boats.

NOVA SCOTIA

Advocate Harbour	Cumberland	E. C. Moore	Nil	Nil	Nil
Amherst	Cumberland				
Annapolis Royal	Annapolis				
Antigonish	Antigonish				
Apple River	Cumberland				
Arichat	Richmond				
Baddeck	Victoria				
Barrington	Shelburne				
Barton	Digby				
Bayfield	Antigonish				
Belliveau Cove	Digby				
Bear River	Digby				
Bridgewater	Lunenburg	V. C. Owen	32	2	16 60

RETURN OF SHIPPING MASTES—*Continued*

NOVA SCOTIA—*Concluded*

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen Discharged	Amount
Canning	Kings	J. N. Miller	Nil	Nil	Nil
Canso	Guysborough	P. C. Cullen	6	10	6 00
Church Point	Digby				
Clark Harbour	Shelburne				
Clementsport	Annapolis				
Cheverie	Hants	Nelson Brady	3	8	3 90
Descousse	Richmond				
Digby	Digby				
Five Islands	Colchester	H. E. Fulmer	Nil	Nil	Nil
Glace Bay	Cape Breton				
Great Village	Colchester				
Guysborough	Guysborough				
Hawkesbury	Inverness				
Halifax	Halifax	H. S. Drake	4,410	4,046	3,418 80
Hastings	Inverness				
Hantsport	Hants	J. W. Lawrence	29	30	23 50
Havre Bouche	Antigonish				
Isaac Harbour	Guysborough				
Jordan Bay	Shelburne	E. Lyle Martin			
Lahave	Lunenburg	E. M. Reinhardt	183	187	147 60
Liscomb	Guysborough	Wm. Henlow	6	Nil	3 00
Liverpool	Queens	W. A. Smith	85	25	50 00
Lockeport	Shelburne	J. R. Ruggles	79	14	43 70
Louisburg	Cape Breton	A. M. Townsend			
Londonderry	Colchester				
**Lunenburg	Lunenburg	William Shupe	502	432	572 10
***Mahone Bay	Lunenburg	T. F. Mader	13	13	22 90
Mainadieu	Cape Breton	A. McDougall	Nil	Nil	Nil
Maitland	Hants				
Margaretsville	Annapolis				
Margaree	Inverness				
Merigomish	Pictou				
Meteghan	Digby				
New Campbellton	Victoria				
North East Harbour	Shelburne	G. B. Swaine	Nil	Nil	Nil
North Sydney	Cape Breton				
Parrsboro	Cumberland	E. Woodworth	142	152	116 60
Pictou	Pictou	W. E. Jones	47	43	36 40
Port Greville	Cumberland	V. N. Elderkin	62	48	50 20
Port Hawkesbury	Inverness				
Port Hastings	Inverness	Geo. L. MacLean	2	1	
Port Hood	Inverness				
Port Latour	Shelburne	Benj. R. Smith	Nil	Nil	Nil
Port Lorne	Inverness				
Port Medway	Queens				
Port Morien	Cape Breton				
Port Mulgrave	Guysborough				
Port Wade	Annapolis				
Port Williams	Kings				
Pubnico	Yarmouth	J. L. Belliveau	Nil	Nil	Nil
Pugwash	Cumberland				
River Hebert	Cumberland				
Riverport	Lunenburg	E. Wentzell	71	70	56 50
St. Anns	Victoria				
St. Peters	Richmond				
Salmon River	Digby				
Sheet Harbour	Halifax				
Shelburne	Shelburne	A. C. Bruce	11	5	7 00
Sherbrooke	Guysborough				
Spencers Island	Cumberland	Geo. D. Spicer	1	Nil	0 50
Sydney	Cape Breton	V. Mullins (Acting)	603	551	466 80
Thorne Cove	Annapolis				
Truro	Colchester				
Tatamagouche	Colchester	J. Ramsay	Nil	Nil	Nil
Wallace	Cumberland	A. D. Macfarlane	Nil	Nil	Nil
Walton	Hants				
West Arichat	Richmond				
Weymouth	Digby				
Windsor	Hants				
Wolfville	Kings				
Yarmouth	Yarmouth	S. Harding	304	312	245 60
			992	939	776 40

**Shipped 50 fishing crews.

***Five fishing crews shipped at $2.50.

RETURN OF SHIPPING MASTERS—*Concluded*

PRINCE EDWARD ISLAND

Name of Port	Name of County	Name of Shipping Master	Seamen Shipped	Seamen Discharged	Amount
Alberton	Prince				
Charlottetown	Queens	F. Beers	39	39	31 20
Crapaud	Queens	Neil Waddell	Nil	2	0 50
Georgetown	Kings				
Malpeque	Prince	R. J. Crafer	Nil	Nil	Nil
Murray Harbour	Kings				
Montague	Kings				
Pinette	Queens				
Port Hill	Prince				
St. Peters	Kings				
Souris	Kings				
Summerside	Prince				
Tignish	Prince				
			39	41	31 70
BRITISH COLUMBIA					
Aboucet	Vancouver				
Clayoquot	Comox-Atlin				
Hesquiat	Comox-Atlin				
Kyuquot	Comox-Atlin	A. Ellis	Nil	Nil	Nil
Massett	Comox-Atlin				
New Westminster	New Westminster				
Prince Rupert	Atlin	E. McCoskrie	281	235	211 00
Tofino	Comox-Atlin				
Vancouver	New Westminster	J. B. Campbell	4,757	4,561	3,701 80
Victoria	Victoria	Geo. Kirkendal	1,526	1,623	1,234 90
			6,564	6,419	5,147 70

RECAPITULATION

——	Seamen Shipped	Seamen Discharged	Amount
			$ cts.
Quebec	9,085	7,945	8,193 45
New Brunswick	1,764	1,759	1,457 70
Nova Scotia	992	939	776 40
Prince Edward Island	39	41	31 70
British Columbia	6,564	6,419	5,147 70
	18,444	17,103	15,606 95

LIVE STOCK SHIPMENTS

LIST OF LIVE STOCK SHIPPED FROM MAY, 1921, TO NOVEMBER, 1921, TO PORTS IN GREAT BRITAIN

MONTREAL

Months	Sheep	Cattle	Horses
1921			
May	480	2,984	
June	1,404	3,664	
July		3,867	76
August		4,733	
September	180	6,742	40
October			
November		4,275	
Total	2,064	26,265	116

EXPENDITURE AND REVENUE

The parliamentary appropriation for the fiscal year 1921-22, was $16,144,980, the expenditure $11,302,793.20, leaving an unexpended balance of $4,842,186.80. The net revenue was $701,496.85.

CORRESPONDENCE

The number of letters received during the fiscal year 1921-22 was 118,080, as against 76,432 in 1920, an increase of 41,648.

The number of letters sent out was 41,500, as against 44,000 in 1920-21, a decrease of 2,500, but in addition to letters copied in our letter book, it is estimated that 11,156 circulars, letters inviting tenders, etc., were dispatched.

SEASON OF NAVIGATION

At the port of Montreal the channel to Quebec was clear on March 29, twenty-one days earlier than last year. On this date the C.G.S. *Lady Grey* arrived at Montreal from Quebec.

The first overseas ship, the *Venusia,* arrived from London on April 21.

Navigation closed on December 8, with the departure of the tank steamer *G. R. Crowe* for New York.

NEW LEGISLATION

During the parliamentary session of 1922 new legislation affecting the department was enacted as follows:—

An Act to amend the Canada Shipping Act (Pilotage), Bill No. 79, assented to on June 28.

An Act to amend the Canada Shipping Act (Public Harbours and Harbour Masters), Bill No. 144, assented to on June 28.

An Act to provide for further advances to the Harbour Commissioners of Montreal, Bill No. 80, assented to on June 28.

An Act to provide for further advances to the Quebec Harbour Commissioners, Bill No. 78, assented to on June 28.

An Act to amend the Vancouver Harbour Commissioners Act, Bill No. 106, assented to on June 28.

An Act respecting the Harbour of Trenton, in the Province of Ontario, Bill No. 204, assented to on June 28.

STEAMBOAT INSPECTION

The report of the Chairman of the Board of Steamboat Inspection is published as a supplement to the annual report.

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.